PUBLICATIONS, MAPS, & SERVICES

MANITOBA
DEPARTMENT OF ENERGY AND MINES
MINERAL RESOURCES DIVISION

PETROLEUM BRANCH

NOVEMBER, 1982

Publications, Maps and Services
Manitoba Petroleum Branch

Preface

The purpose of this publication is to present a brief introduction to Manitoba's position related to petroleum production and prospects along with a comprehensive list of information and services available through the Manitoba Petroleum Branch.

Section 1 provides an overview of the regional setting and producing areas of Manitoba along with a brief outline of the responsibilities and functions of the Manitoba Petroleum Branch. The intent of this section is to provide generalized background information for those who are not familiar with the Manitoba setting.

Section 2 provides a comprehensive listing of the information and services available from the Petroleum Branch. All non-confidential information listed in this section is made available in order to encourage and aid in the development of Manitoba's oil and natural gas resources.

All requests for information should be directed to the following address:

Manitoba Petroleum Branch
Mineral Resources Division
Department of Energy and Mines
989 Century Street
Winnipeg, Manitoba
R3H 0W4

Phone: (204) 633-9543

Note: - where charges are stated, prepayment is requested (cheques or money orders should be made payable to the "Minister of Finance")

- unless otherwise requested, out of province orders will be sent by regular postal delivery.

- prices are subject to change without notice.

TABLE OF CONTENTS

Preface

Page No.

Section 1 - Overview

I. Geological Setting of Manitoba 1

II. Oil Production in Manitoba 1

III. Role of the Petroleum Branch 6

Section 2 - List of Information and Services Available

I. Administrative Information

A) Acts and Regulations 10
B) Informational Notices and Forms 10

II. Publications

A) General Informational Publications 11
B) Geological Publications 11

III. Maps

A) Stratigraphic Maps 14
B) Well Location Maps 16
C) Crown Mineral Rights Maps 16
D) Miscellaneous Base Maps 17
E) Other Maps 17

IV. Reports

A) Geological Reports 18
B) Selected Bibliography 18
C) Technical Data Lists 19

V. Geological and Geophysical Data

A) Geological Data 21
B) Seismic Data 27
C) Other Geophysical Data 38
D) Hudson Bay Lowlands Data 45
E) Oil Shale Exploration Data 47
F) Helium Exploration Data 49
G) Velocity Surveys 50

VI. Technical Well Data 52

VII. Core and Sample Library 52

Section 1 - Overview

I. Geological Setting of Manitoba

The sedimentary strata in Manitoba occur in two distinct regions - the south-western plains area and the far north Hudson Bay Lowlands area. These two areas of occurrence are related to two distinct tectonic settings - the Williston Sedimentary Basin to the south-west, and the Hudson Bay Sedimentary Basin to the north-east. The location of Manitoba in relation to these two Basins is shown on Figure 1. A generalized map portraying the bedrock geology of Manitoba is presented in Figure 2. Approximately 40% of the total area of the Province is underlain by sedimentary strata of Paleozoic, Mesozoic, and Cenozoic ages.

The Paleozoic and Mesozoic strata of south-western Manitoba occur as a wedge-like segment on the north-eastern flank of the Williston Sedimentary Basin. A schematic cross-section through the sedimentary strata of south-western Manitoba is presented in Figure 3. As in most of western Canada, a major angular unconformity marks the contact between Paleozoic and Mesozoic beds in Manitoba. The dominant lithologies in the Paleozoic system are limestones, dolomitic limestones, and argillaceous limestones. Evaporites are also common along with sands and shales which become more important towards the base of the Paleozoic. In contrast, shales, silts and sands dominate in the Mesozoic sequence occuring above the unconformity. These Jurassic and Cretaceous beds dip more gently to the south-west than do the underlying Paleozoic beds.

A Table of Geological Formations in south-western Manitoba is presented in Figure 4. The total thickness of the sedimentary strata exceeds 2300 metres in the south-western corner of the Province.

The Paleozoic strata of the Hudson Bay Lowlands are believed to represent the south-western flank of the Hudson Bay Sedimentary Basin. Onshore stratigraphic tests have indicated a maximum sedimentary thickness of approximately 1 000 metres. Geophysical data have suggested that the sedimentary thickness may exceed 2 500 metres in the central offshore parts of the Basin. The sedimentary strata present in north-eastern Manitoba are Ordovician, Silurian and Devonian in age.

II. Oil Production in Manitoba

In January 1951, the California Standard Company completed the first "discovery well" within Manitoba. Located on Lsd. 15-18-10-27 WPM, this well lies within the Daly Field, approximately 10 miles west of the Town of Virden. This discovery sparked a "boom" of activity which led to the discovery and development of hundreds of productive oil wells.

The principal oil fields and producing areas in Manitoba are

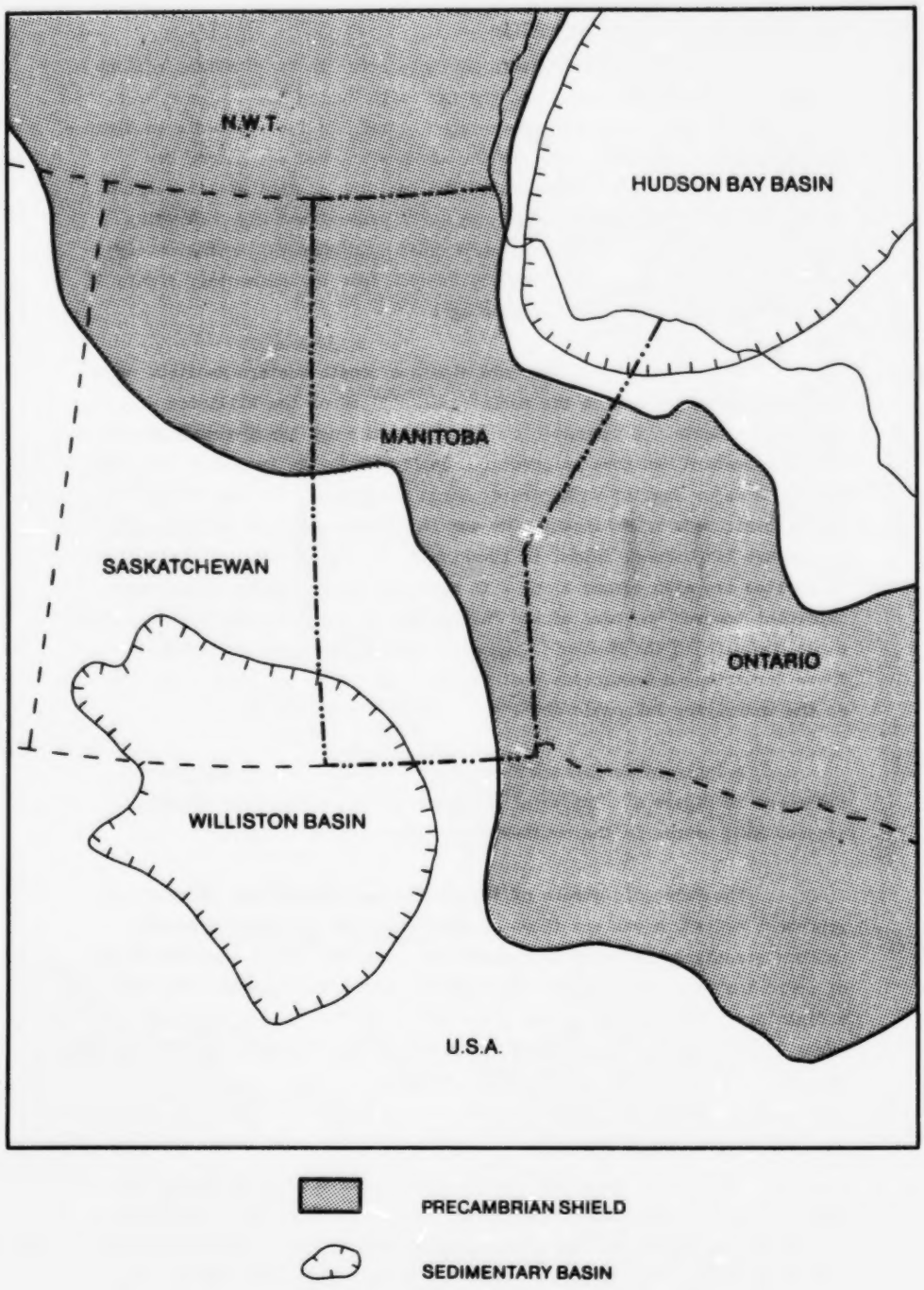


FIG. 1: WILLISTON AND HUDSON BAY BASINS

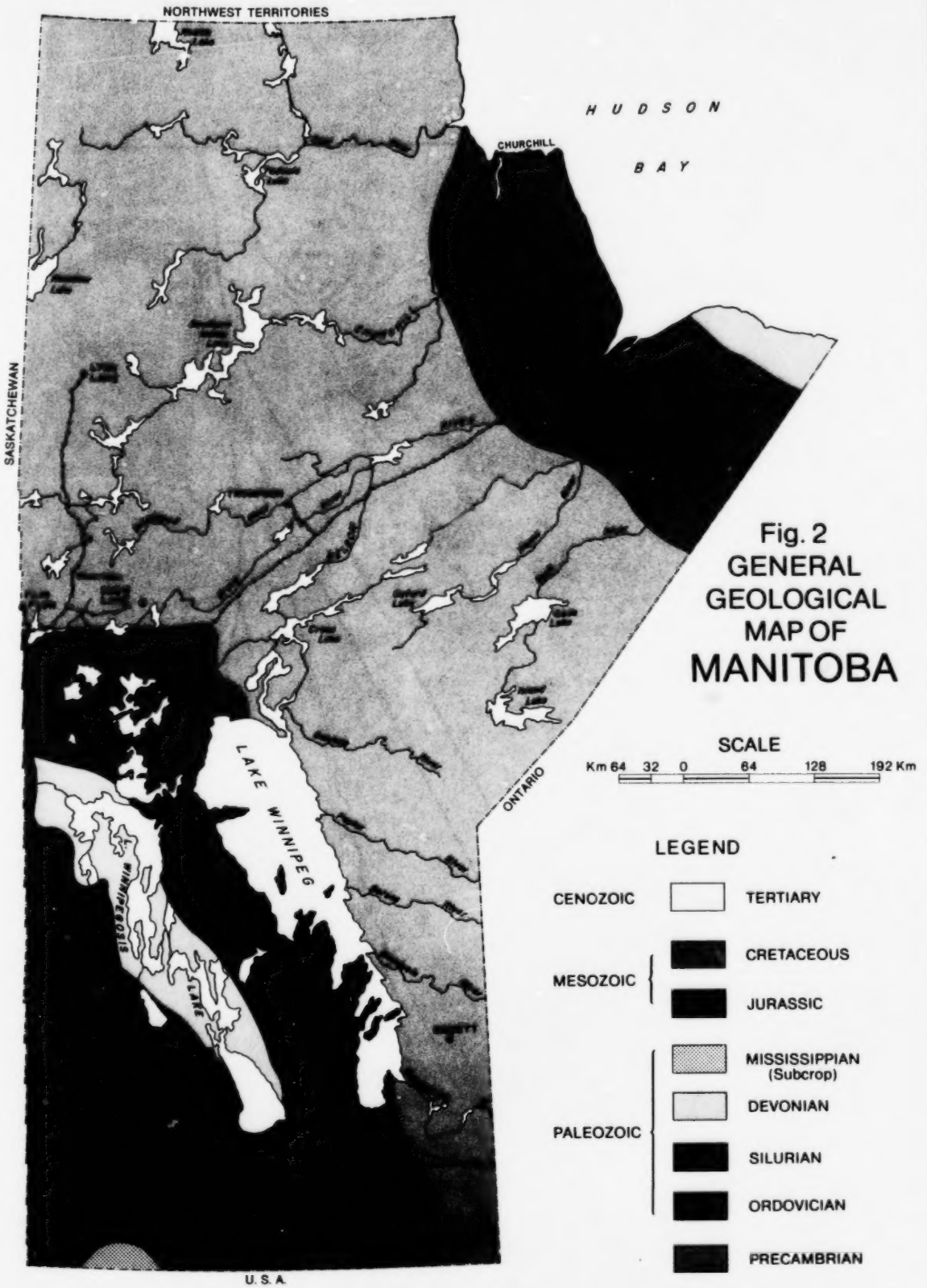


Fig. 2
GENERAL
GEOLOGICAL
MAP OF
MANITOBA

FIG. 3: SCHEMATIC SECTION OF GEOLOGICAL STRUCTURE IN SOUTHWESTERN MANITOBA

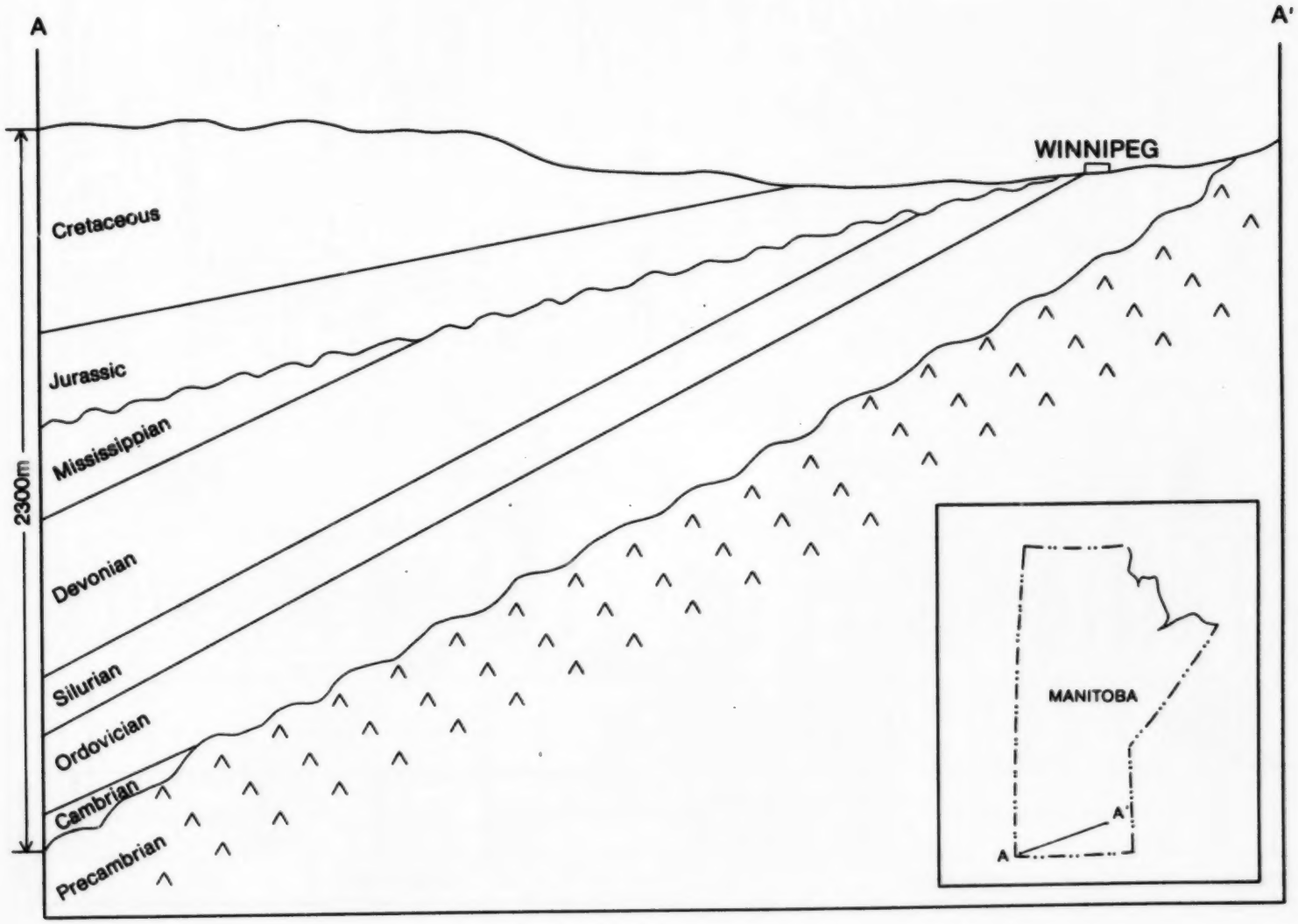
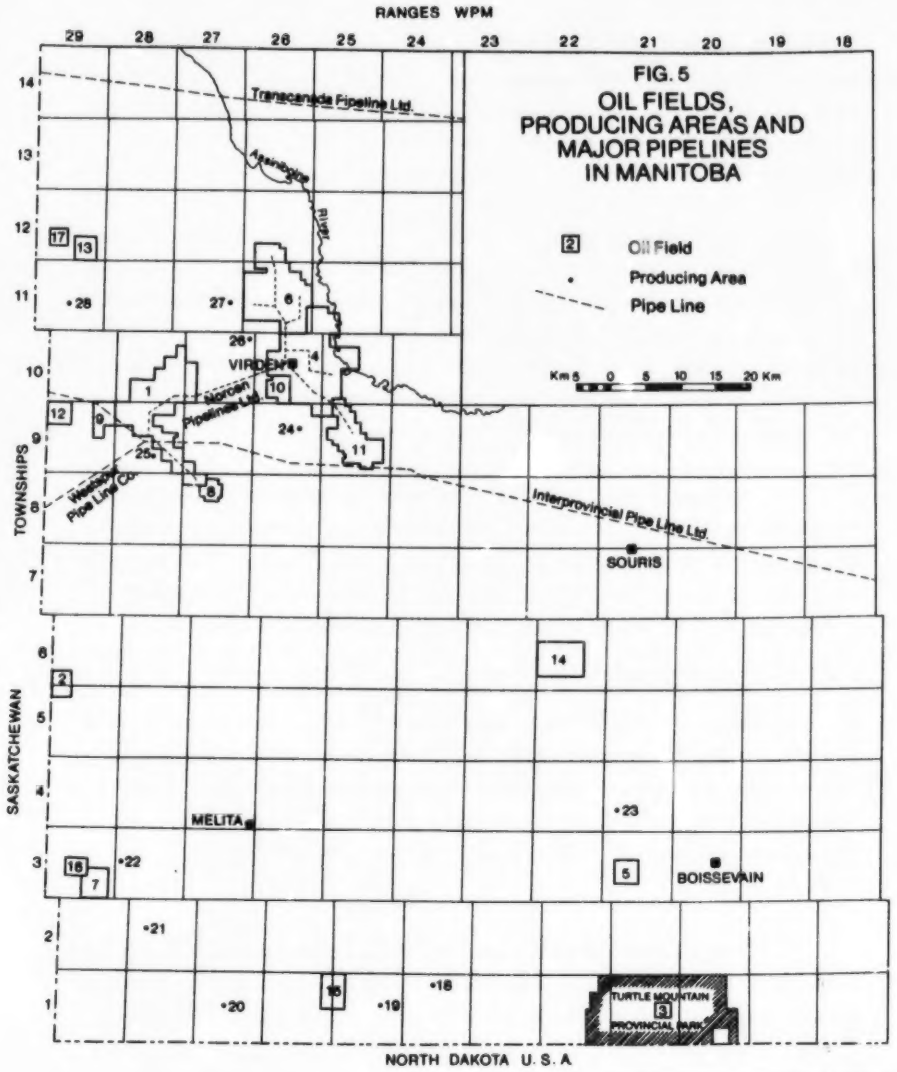


FIG. 4: GEOLOGICAL FORMATIONS IN MANITOBA

ERA	PERIOD	EPOCH	FORMATION	MEMBER	MAX THICK (m)	BASIC LITHOLOGY
CENOZOIC	QUATERNARY	RECENT				TOP SOIL, DUNE SANDS
		PLEISTOCENE	GLACIAL DRIFT		140	CLAY, SAND, GRAVEL, BOULDERS, PEAT
	TERTIARY	PLIOCENE				
		MIOCENE				
		OLIGOCENE				
		EOCENE				
		PALEOCENE	TURTLE MTN.	PEACE GARDEN	120	SHALE, CLAY AND SAND. LIGNITE BEDS LOCATED ONLY IN TURTLE MOUNTAIN
				GOODLANDS		
MESOZOIC	CRETACEOUS	UPPER CRETACEOUS	BOISSEVAIN		30	SAND AND SANDSTONE, GREENISH GREY, LOCATED ONLY IN TURTLE MOUNTAIN
			RIDING MTN.	COULTER ODANAH BELLOCK	310	GREY SHALES – NON-CALC. LOCAL IRONSTONE BENTONITE NEAR BASE. GAS FOUND
			VERMILION RIVER	PEMBINA	155	SHALE DARK GREY CARBONACEOUS NON-CAL BENTONITE BANDS
				BOYNE		SHALE GREY SPECKLED CALC. BENTONITIC SLIGHTLY PETROLIFEROUS
				MORDEN		SHALE DARK GREY NON-CALC. CONCRETIONS LOCAL SAND AND SILT
			FAVEL		40	GREY SHALE WITH HEAVY CALCAREOUS SPECKS BANDS LIMESTONE AND BENTONITE
		LOWER CRETACEOUS	ASHVILLE		115	SHALE, DARK GREY, NON-CALC. SILTY
			ASHVILLE SAND			"SAND ZONE" 27m F.G. QTZ. S. OR SS
			SWAN RIVER		75	SANDSTONE AND SAND, QTZ. PYRITIC SHALE – GREY, NON-CALC.
	JURASSIC	UPPER JURASSIC	WASKADA		200	BANDED-GREEN SHALE AND CALC. SANDSTONE
			MELITA			BANDS OF LIMESTONE, VARI-COLORED SHALE
		MIDDLE JURASSIC	RESTON		45	LIMESTONE, BUFF, AND SHALES, GREY
			AMARANTH	UPPER EVAPORITE	45	WHITE ANHYDRITE AND/OR GYPSUM AND BANDED DOLOMITE AND SHALE
				LOWER RED BEDS	40	RED SHALE TO SILTSTONE-DOLOMITIC
	TRIASSIC					
PALEOZOIC	PERMIAN	(?)	ST. MARTIN COMPLEX		300	CARBONATE BRECCIA, TRACHYANDESITE (CRYPTO-EXPLOSION STRUCTURE)
	PENNSYLVANIAN					
	MISSISSIPPIAN		MADISON GROUP: CHARLES		20	MASSIVE ANHYDRITE AND DOLOMITE
			MADISON GROUP: MISSION CANYON	MC–5	120	LIMESTONE – LIGHT BUFF, OOLITIC, FOSS, FRAG., CHERTY, BANDS SHALE AND ANHYDRITE. OIL PRODUCTION
				MC–4		
				MC–3		
				MC–2		
				MC–1		
			MADISON GROUP: LODGEPOLE	FLOSSIE LAKE	185	LIMESTONE & ARG. LIMESTONE LIGHT BROWN AND REDDISH MOTTLED. ZONES OF SHALEY, OOLITIC, CRINOIDAL & CHERTY. OIL PRODUCTION
				WHITEWATER LAKE		
				VIRDEN		
				BCALLION / ROUTLEDGE		
			BAKKEN	UPPER	20	2 BLACK SHALE ZONES – SEPARATED BY SILTSTONE. OIL SHOW HIGH R.A. KICK.
				MIDDLE		
				LOWER		
	DEVONIAN		SWAN HILLS	LYLETON	35	RED SILTSTONE AND SHALE DOLOMITIC
			BASK GROUP	NISKU	40	LIMESTONE & DOLOMITE, YELLOW-GREY FOSS. POROUS. SOME ANHYD.
				DUPEROW	170	LIMESTONE & DOLOMITE, ARG. & ANHYDRITIC IN PLACES
			MANN GROUP	SOURIS RIVER 1-ST RED	120	CYCLICAL SHALE, LIMESTONE & DOLOMITE, ANHYDRITE
				DAWSON BAY 2-ND RED	65	LIMESTONE & DOLOMITE, POROUS, ANHYDRITE – LOCAL SHALE RED & GREEN
			ELK POINT G.	PRAIRIE EVAP	120	SALT POTASH & ANHYDRITE, DOLOMITE INTER-BEDDED
				WINNIPEGOSIS	75	DOLOMITE, LIGHT YELLOWISH BROWN REEFY
				ELM POINT		LIMESTONE – FOSS, HIGH CALCIUM
				ASHERN	12	DOLOMITE AND SHALE – BRICK RED
	SILURIAN		INTERLAKE GROUP		135	DOLOMITE YELLOWISH – ORANGE TO GREYISH – YELLOW FOSS. SILTY ZONES
	ORDOVICIAN		STONEWALL		15	DOLOSTONE, GREYISH YELLOW, BEDDED.
			STONY MOUNTAIN	WILLIAMS	30	DOLOMITE – YELLOWISH – GREY SHALEY
				GUNTON		DOLOMITE – DUSKY – YELLOW FOSS.
				PENITENTIARY	20	SHALE RED-GREEN FOSS. LIMESTONE BANDS.
				GUNN		
			RED RIVER	FORT GARRY	170	DOLOMITIC LIMESTONE, MOTTLED AND DOLOMITE
				SELKIRK		
				CAT HEAD		
				DOG HEAD		
			WINNIPEG	UPPER UNIT	60	SHALE, GREEN, WAXY, SANDSTONE INTERBEDDED.
				SANDSTONE		SAND, SANDSTONE, QUARTZOSE
	CAMBRIAN		DEADWOOD		60	SAND, BLACK TO GREEN-GREY WAXY, GLAUCONITIC SILTSTONE & SHALE, GREEN-GREY TO BLACK. VERY EDGE OF S.W. MANITOBA ONLY.
PRECAMBRIAN						ACID & BASIC CRYSTALLINES & METAMORPHICS

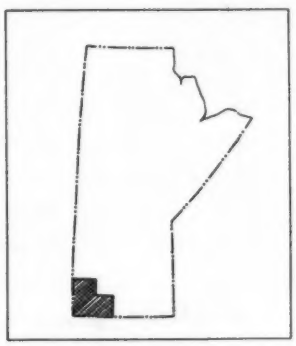


OIL FIELDS

1. Daly
2. Tilston
3. Lulu Lake
4. Virden-Roselea
5. Whitewater
6. North Virden Scallion
7. Pierson
8. Woodnorth
9. Ebor
10. Maples
11. Routledge
12. West Butler
13. Kirkella
14. Souris Hartney
15. Waskada
16. Northwest Pierson
17. West Kirkella

PRODUCING AREAS

18. Goodlands
19. East Waskada
20. Coulter
21. South-east Pierson
22. North-east Pierson
23. Regent
24. South Maples
25. South Daly
26. West Scallion
27. East Hargrave
28. West Elkhorn



DEPARTMENT OF ENERGY AND MINES

PETROLEUM BRANCH

presented in Figure 5. The four most important fields in Manitoba, in terms of production are (in order) North Virden Scallion, Virden-Roselea, Daly and Routledge. Total crude oil production in 1981 was 542,695 cubic metres. As of December 31, 1981, there were a total of 853 wells classified as capable of oil production in Manitoba.

The major producing oil pools of south-western Manitoba occur in carbonates of the Mississippian Lodgepole Formation. Production is also obtained from the Mission Canyon carbonates, also of Mississippian age. The trapping mechanism is primarily stratigraphic with oil accumulations being found where porous reservoir strata are truncated at the pre-Jurassic erosional surface. Other factors, both structural and lithological, are also known to control oil accumulations to some extent.

In June of 1980 a former Mississippian producer in the Waskada Field was recompleted in the Jurassic Lower Amaranth Formation marking the first non-Mississippian oil production in the province. Development of this pool is currently in progress and indications are that this new productive horizon may add significantly to provincial reserves.

Zones of potential hydrocarbon accumulation are present throughout the sedimentary column of south-western Manitoba. Of particular interest are zones below the Mississippian as relatively few wells have penetrated the complete sedimentary column and, consequently, these zones remain largely unexplored. Figure 6 shows the location of all wells drilled to the Precambrian basement in a portion of south-western Manitoba as of June 30, 1982.

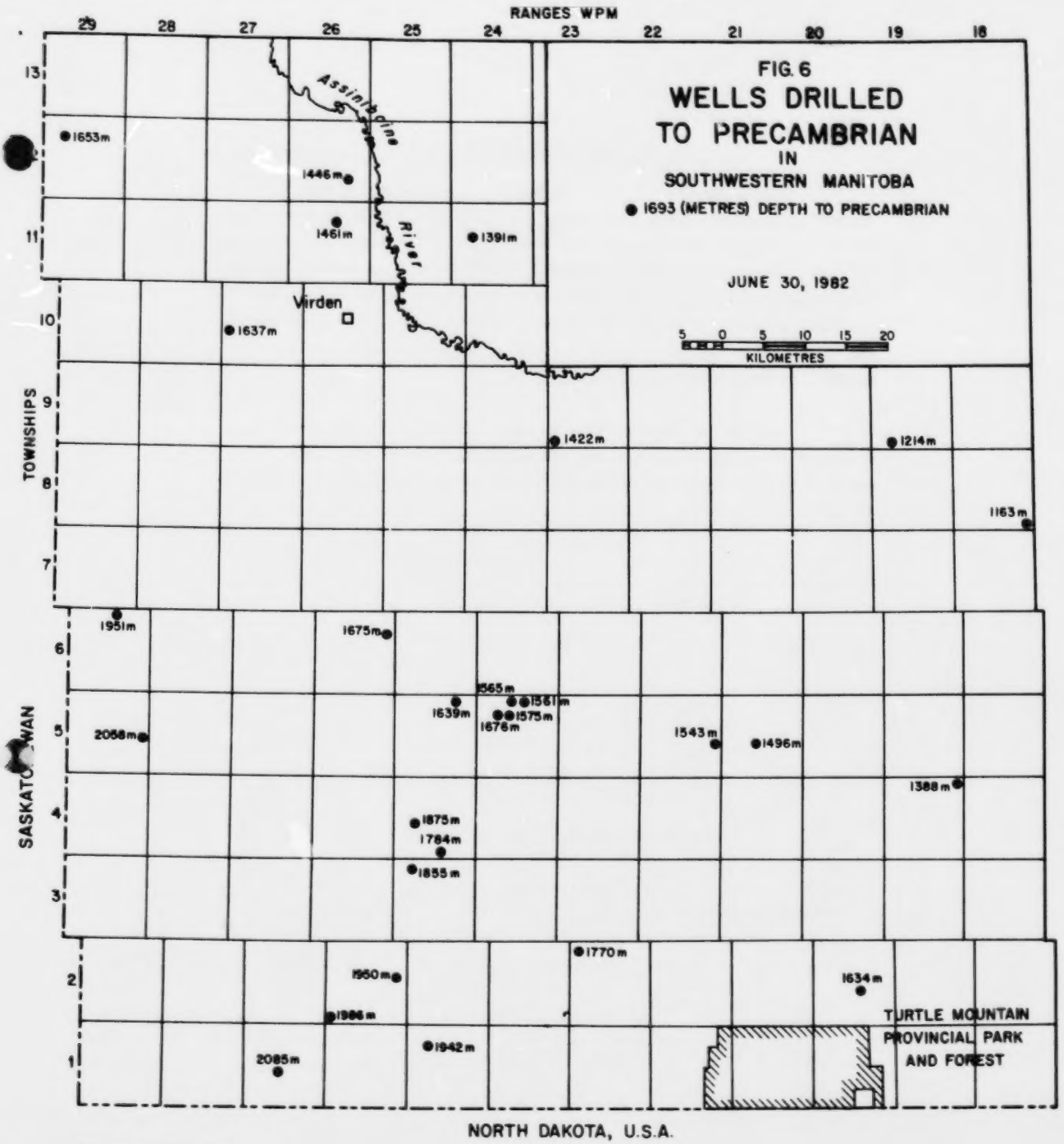
Several pre-Mississippian formations present in Manitoba are known to have good reservoir characteristics and are productive elsewhere to the south and west in the Williston Basin. These include the Cambrian Deadwood, the Ordovician Winnipeg and Red River, the Silurian Interlake and the Devonian Winnipegosis, Dawson Bay, Duperow and Nisku Formations.

Potential reservoir beds are also known to exist in the Ordovician and Silurian strata of the Hudson Bay Lowlands in north-eastern Manitoba. However, very limited exploration activity has left the petroleum prospects of the Hudson Bay Basin largely unevaluated at this time.

III. Role of the Petroleum Branch

The Manitoba Petroleum Branch is responsible for the regulation of exploration, development, and production activities conducted by the oil and gas industry in Manitoba as well as all matters related to the disposition of Crown oil and natural gas rights. To this end, the Branch office is organized into three sections:

1. Administration — Winnipeg Office
2. Engineering & Geology — Winnipeg Office
3. Inspection — Virden District Office



1 Metre = 3.2808 Feet

FACTS AND FIGURES ON DEEP DRILLING IN SOUTHWESTERN MANITOBA

Area shown on the map above covers over 132 townships or 12 307 square kilometres (4,752 square miles) equivalent to 1 230 745 hectares (3,041,280 acres).

To date, only the 28 wells indicated on the map have been drilled through the complete sedimentary section (to Precambrian) in the area shown. Most drilling in the area has been to Mississippian formations, at depths ranging between 600 m (2,000 feet) and 1 050 m (3,500 feet). Oil and gas shows have been found in the deeper formations - Devonian, Silurian and Ordovician, but not in sufficient quantities to warrant their development. Current cost of drilling is estimated at $100,000 to $400,000

The 28 Precambrian wells shown represents approximately

1 well for every 5 Townships (170 square miles).

By comparison the North Virden Scallion Unit covers less than 1/2 township and has already produced over 7,900,000 cubic metres (approximately 50,000,000 barrels) of crude oil.

One of the functions of the Branch is the recording and dissemination of petroleum exploration and production information with the aim of encouraging and aiding in the development of petroleum resources in Manitoba. The Branch makes available non-confidential information in the form of publications, reports, maps and various forms of technical data including a library of cores and samples. All inquiries are welcome and the Branch has technical staff on hand for consultation relating to engineering and geological matters.

Section 2 of this publication is a listing of the information and services available through the Manitoba Petroleum Branch. This material is made available for inspection or may be reproduced and forwarded at cost.

Section 2 - List of Information and Services Available

I. Administrative Information

A) Acts and Regulations (no charge)

1. The Mines Act, Chapter M160
   - contains legislative authority for regulations concerning oil and natural gas exploration and production and Crown land tenure and royalties

2. Manitoba Regulation 231/78 (under The Mines Act)
   - covers disposition of Crown land by lease or reservation and royalties on production from Crown land.

3. Manitoba Regulation 202/82 (under The Mines Act)
   - covers geological and geophysical (seismic) exploration programs.

4. Manitoba Revised Regulation M160-R1P (under The Mines Act)
   Part IV - covers drilling and production operations
   Part VI - covers Crown land disposition and exploration approvals in the Far North (Hudson Bay Lowlands)

5. The Oil and Natural Gas Tax Act, Chapter O35
   - covers a tax levied against producing freehold mineral rights

6. The Pipe Line Act, Chapter P70
   - covers licensing and operation of oil and salt water pipelines

7. The Gas Storage and Allocation Act, Chapter G52
   - covers underground gas storage

8. The Gas Pipeline Act, Chapter G50
   - covers gas pipelines

B) Information Notices and Forms (no charge)

Informational Notices and Forms pertaining to the following are available upon request.

- Crude oil royalties, taxes, and pricing
- Applications for exploration, drilling and production operations
- Guidelines for technical field operations

Please indicate specific information required.

II. Publications

A) General Informational Publication.

1. Well Location Key List ($20.00)

   - Contains a listing of all Drilling Licenses issued with corresponding well name, location, and current status of well. Listing is available in either chronological or geographical order. Unless otherwise specified, the geographical listing will be sent.

2. Weekly Well Activity Report ($50.00 per calendar year subscription)

   - A weekly publication that provides latest released information on field activities (eg.: new wells licensed, drilling information, well status, name changes, Crown Land Sale results, etc.)

3. Production Statistics and Activity Report ($50.00 per calendar year subscription)

   - A monthly and annual publication that includes monthly and cumulative oil and water production statistics by individual wells, units and fields, plus salt water disposal statistics by well. Also contains information from Weekly Well Activity Reports and well information as it is released from confidential status. Annual subscription consists of twelve monthly plus one annual publication.

   Individual copies: Monthly publication - $ 5.00 per copy
   Annual publication - $ 10.00 per copy*

   *(also available for each year since 1955).

4. Manitoba's Producing Oil Fields (no charge)

   - A statistical table (metric) showing remaining recoverable reserve estimates for each producing Field along with average production depths, producing formations, oil density, discovery year and number of producing wells.

B) Geological Publications

The following is a list of reports relating to oil and gas exploration published by the Mineral Resources Division of the Department of Energy and Mines. These publications are available through the Petroleum Branch.

Division Publication Number	Title	Price
49-2	Devonian Geology of Lake Manitoba - Lake Winnipegosis Area by: Andrew D. Baillie	$ 1.00
50-1	Silurian Geology of the Interlake Area - Manitoba, by: Andrew D. Baillie	1.00
51-2	Bibliography of Geology, Palaeontology Industrial Minerals, and Fuels in the Post-Cambrian Regions of Manitoba to 1950, by: Lillian B. Kerr	0.50
51-6	Ordovician Geology of Lake Winnipeg and Adjacent Areas - Manitoba, by: A. D. Baillie	1.00

Division Publication Number	Title	Price
52-5	Devonian System of the Williston Basin Area By Andrew D. Baillie	$ 2.00
54-2	Jurassic Stratigraphy of Manitoba - By Donald F. Stott	1.00
57-4	Bibliography of Geology, Palaeontology, Industrial Minerals, and Fuels in the Post-Cambrian Regions of Manitoba 1950-57 By B. A. Mills	0.50
58-1	Mississippian Stratigraphy of Manitoba By H. R. McCabe	2.00
59-1	Potash Deposits, Rock Salt and Brines in Manitoba, by: B. B. Bannatyne	1.00
59-6	Fauna of the Manitoba Group in Manitoba By Helen McCammon	2.00
60-5	Mississippian Oil Fields of Southwestern Manitoba, by: H. R. McCabe	5.00
62-5	Cretaceous Bentonite Deposits of Manitoba By B. B. Bannatyne	1.00
79-2	Geological Map of Manitoba	3.00
66-1	Bibliography of Geology, Palaeontology, Industrial Minerals and Fuels in the Post-Cambrian Regions of Manitoba 1958 - 1965 By B. B. Bannatyne	0.50
67-1	The Clays and Shales of Manitoba By B. B. Bannatyne	2.00
GP 3/70	Lake St. Martin Crypto-Explosion Crater and Geology of Surrounding Area By H. R. McCabe & B. B. Bannatyne	2.00
ER 77-1	Summary of Available Data on Lignite Deposits Turtle Mtn., Manitoba, by: B. B. Bannatyne	3.00
GP 78-3	Reservoir Potential of the Deadwood and Winnipeg Formations, Southwestern Manitoba By H. R. McCabe	2.00
Misc. Paper	Geology and Mineral Resources of Manitoba, 1962 By J. F. Davies, B. B. Bannatyne, G. S. Barry and H. R. McCabe	1.00
Misc. Paper	Reference Manual - Field Trip No. 5, Lower Paleozoic of the Interlake Area, Manitoba	1.50
Misc. Paper	Reference Manual - Field Trip No. 6 Paleozoic and Mesozoic of the Dawson Bay Area and Manitoba Escarpment, Manitoba	3.00
GR 78-2	Stratigraphy of the Riding Mountain, Boissevain and Turtle Mountain Formations in the Turtle Mountain Area, Manitoba By J. D. Bamburak	4.00
	Geology and Hydrocarbon Potential of the Lower Amaranth Formation in the Waskada-Pierson Area, Southwestern Manitoba By D. Barchyn (currently in press; available by early 1983)	

The following miscellaneous publications are out of print but can be reproduced at a cost of $0.25 per page:

Evaluation of Rock Salt in Prairie Evaporite Formation, Manitoba, by: B. B. Bannatyne and H. R. McCabe, Dec./66 (46 pgs.)

Tectonic Framework of Paleozoic Formation in Manitoba by H. R. McCabe, 1966 (10 pgs.)

Excerpts from "The Geological Association of Canada, Special Paper No. 9, 1971":

- Stratigraphy of Manitoba, An Indroduction and Review, by H. R. McCabe (21 pgs.)

- Ordovician and Silurian Stratigraphy of the Interlake Area, Manitoba, by J. Cowan (7 pgs.)

- Depositional Framework of the Winnipeg Formation in Manitoba and Eastern Saskatchewan by L. W. Vigrass (10 pgs.)

- Ordovician Strata of the Hudson Bay Lowlands in Northern Manitoba, by L. M. Cumming (9 pgs.)

- Silurian Stratigraphy of Northern Manitoba, by B. S. Norford (9 pgs.)

III. Maps

A) Stratigraphic Maps - ($2.00 each)

The following is a list of a series of maps prepared by the Mineral Resources Division which detail the stratigraphy of southern Manitoba.

Map No.		Map Scale
P-1	Palaeozoic Erosion Surface: structure contour-outcrop-subcrop	1" = 16 mi.
P-2	Palaeozoic Erosion Surface: Structure contour-subcrop, detail for Swan River area (Twps. 33-38, Rges. 25-29)	1" = 3 mi.
M-1	Mississippian Madison Group: isopach	1" = 4 mi.
M-2	Mississippian Erosion Surface: structure contour-subcrop	1" = 4 mi.
M-3	Mississippian: structure contour on Middle Daly ("First Crinoidal") Member, Daly Field Area	
M-4	Mississippian: structure contour on Upper Virden ("Crinoidal") Member, Virden Area (including Virden Roselea, North Virden Scallion, Routledge, West Routledge and Maples fields)	2" = 1 mi.
DM-1	Devonian-Mississippian, Bakken & Lyleton Formations structure contour-isopach-subcrop	1" = 4 mi.
DN-1	Devonian Nisku Formation: structure contour-isopach-subcrop	1" = 4 mi.
DD-1	Devonian Duperow Formation: structure contour-isopach-subcrop	1" = 16 mi.
DD-2	Devonian Duperow Formation: structure contour-isopach-subcrop, detail for Swan River Area (Twps. 33-38, Rges. 25-29)	1" = 3 mi.
DSR-1	Devonian Souris River Formation: structure contour-isopach-subcrop-outcrop	1" = 16 mi.
DSR-2	Devonian Souris River Formation: structure contour-isopach-subcrop, detail for Swan River Area (Twps. 33-38, Rges. 25-29)	1" = 3 mi.
DDB-1	Devonian Dawson Bay Formation: structure contour-isopach-subcrop-outcrop	1" = 16 mi.
DEP-1	Devonian Elk Point Group: structure contour-isopach-lithofacies-subcrop-outcrop	1" = 16 mi.
DPE-1	Devonian Prairie Evaporite Formation: structure contour-isopach-lithofacies	1" = 16 mi.
DW-1	Devonian Winnipegosis Formation: structure contour-isopach-subcrop-outcrop	1" = 16 mi.
DA-1	Devonian Ashern Formation: structure contour-isopach-outcrop	1" = 16 mi.
SI-1	Silurian Interlake Group: structure contour-isopach-subcrop-outcrop	1" = 16 mi.

OS-1	Ordovician Stonewall Formation: structure contour-isopach-subcrop-outcrop	1" = 16 mi.
OSM-1	Ordovician Stony Mountain Formation: structure contour-isopach-subcrop-outcrop	1" = 16 mi.
ORR-1	Ordovician Red River Formation: structure contour-isopach-subcrop-outcrop	1" = 16 mi.
OW-1	Ordovician Winnipeg Formation: structure contour-isopach-subcrop-outcrop	1" = 16 mi.
PC-1	Precambrian: structure contour - depth to Precambrian	1" = 16 mi.
KB-TTM-1	Upper Cretaceous (?) Boissevain Formation: (structure contour-isopach-outcrop) and Tertiary Turtle Mountain Formation: (isopach-outcrop)	1" = 2 mi.
K2M-2	Riding Mountain Formation: Odanah Member (structure contour-isopach-outcrop)	1" = 8 mi.
KRM-1	Riding Mountain Formation: Millwood Member (structure contour-isopach-outcrop)	1" = 8 mi.
KVR-2	Vermilion River Formation: Top of Boyne Member to base of Pembina Member (cross-section; structure contour-isopach-outcrop)	1" = 8 mi.
KVR-1	Vermilion River Formation: Morden Member (structure contour-isopach-outcrop)	1" = 8 mi.
KF-1	Favel Formation: (structure contour-isopach-outcrop)	1" = 8 mi.
KA-2	Upper Ashville: to base of fish scale zone (structure contour-isopach-outcrop)	1" = 8 mi.
KA-1	Lower Ashville: from base of fish scale zone (structure contour-isopach-outcrop)	1" = 8 mi.

B) Well Location Maps ($10.00 each or set of 7 for $50.00)

1. Map No. 1

This map comprises the southern half of the Province (includes Twps. 1-46, Rges. 17E-29 WPM) on a scale of 1:500 000. The map shows producing oil fields, major pipelines, Forest Reserves, National Parks, and well locations outside the area covered by Map No. 7.

2. Map Nos. 2-6

Each of these maps covers a specific area in the south-west corner of the province where exploration activity has been the most concentrated. The scale is 1:50 000. The maps show wells drilled and their present status. The areas covered by each of these maps are as follows:

Map No. 2: Twps. 11-13, Rges. 25-29 WPM
Map No. 3: Twps. 6-10, Rges. 25-29 WPM
Map No. 4: Twps. 1-5, Rges. 25-29 WPM
Map No. 5: Twps. 1-5, Rges. 20-24 WPM
Map No. 6: Twps. 6-10, Rges. 20-24 WPM

3. Map No. 7

This is a well location base map of the south-western corner of the Province showing wells drilled and their present status, and includes Field boundries. The scale is 1:125 000 and covers Twps. 1-18, Rges. 19-29 WPM.

Note: All well location maps are updated on a bi-annual basis.

C) Crown Mineral Rights Maps

1. Area Maps ($10.00 each)

Each of these maps covers a specific area in the Province and indicates Crown owned mineral rights.

South-western: Twps. 1-40, Rges. 14-29 WPM
South-central: Twps. 1-30, Rges. 1-13 WPM
South-eastern: Twps. 1-30, Rges. 1-17 EPM

D) Other Maps - Available from Map Sales/Air Photo Library
1007 Century Street
Winnipeg, Manitoba
R3H 0W4

1. Base Maps of Manitoba (3 maps to cover Province)
Scale 1:500 000 ($2.00 each)

2. Map of Manitoba Land Title Districts (1977)
Scale 1:1 000 000 ($1.00)

3. Map of Manitoba Municipalities and Local Government Districts (1977)
Scale 1:1 000 000 ($1.00)

4. Manitoba Road Map (1978)
Scale 1:500 000 ($2.00)

5. National Topographic Series Maps ($2.63)
1:25 000, 1:50 000, 1:125 000, 1:250 000, 1:500 000
1:1 000 000

IV. Reports

This material is available for inspection at the Winnipeg office of the Petroleum Branch. On request, and whenever possible, material may be reproduced and forwarded for the cost of reproduction:

1. Maps $5.00/copy
2. Reports $0.25/page

A) Geological Reports

Unpublished draft reports on geological investigations of specific areas and formations within Manitoba are available. Major reports include:

1. Geological Report and Hydrocarbon Potential of Waskada Area (Twps. 1-3, Rges. 24-26 WPM), 1976 by W. Ghazar (135 pages and 17 maps)
2. Geological Report and Hydrocarbon Potential of Pierson Area (Twps. 1-3, Rges. 27-29 WPM), 1978 by W. Ghazar (116 pages and 12 maps)
3. Report on the Pre-Mississippian Sedimentary Rocks of Southwestern Manitoba, 1964 by J. C. Sproule and Associates (40 pages and 52 maps and cross-sections)

B) Selected Bibliography (24 pages)

This bibliography lists geological and engineering reports and papers, published in various journals and bulletins all relating to oil and gas exploration in Manitoba. The purpose of this listing is to provide the explorationist with a reference to material, not provided by the Petroleum Branch, which may be of use in the evaluation of petroleum prospects in Manitoba.

The Listing is divided into the following six sections:

1. List of Publications pertaining to Oil and Gas Exploration in Manitoba, published by the Geological Survey of Canada.
2. List of Publications pertaining to Oil and Gas Exploration in Manitoba, published and available from DMR, Saskatchewan.
3. List of Publications pertaining to Oil and Gas Exploration in the Hudson Bay, published by the Geological Survey of Canada.
4. List of Theses pertaining to Oil and Gas Exploration in Manitoba.
5. List of Publications pertaining to Oil and Gas Exploration in the Williston Basin.

B) Selected Bibliography (Cont'd)

6. List of published papers on the various Geological Periods and Geographical Areas:

   A. Mesozoic Era
   B. Mississippian Period
   C. Devonian Period
   D. Precambrian - Silurian Periods
   E. Williston Basin
   F. North Dakota
   G. Hudson Bay

C) Technical Data Lists

1. Lower Paleozoic Formation Tops, Bakken to Precambrian
   by: H. R. McCabe, Dec/79 (no charge)

2. Lower Paleozoic Drill Stem Tests and Oil & Gas Shows, Bakken to Precambrian
   by: H. R. McCabe, Dec./79 (no charge)

3. Lower Paleozoic Formation Water Analyses, Bakken to Precambrian
   by: H. R. McCabe, Dec./76 (no charge)

4. Index of Core and Sample Storage (1979)
   (no charge)

V. Geological and Geophysical Data

The following is a list of non-confidential geological and geophysical data available for examination at the office of the Petroleum Branch, 989 Century Street, Winnipeg.

The list has been divided into 7 separate sections:

A) Geological data (from structure test holes, core holes and wells) submitted under Geophysical Licenses and Reservations of Oil and Natural Gas Rights.

B) Seismic data submitted under Geophysical Licenses and Reservations of Oil and Natural Gas Rights.

C) Other geophysical data (magnetic, gravity, radiation) submitted under Geophysical Licenses, Reservations of Oil and Natural Gas Rights and Permits.

D) Information and data submitted under Exploratory Permits for the Far North Hudson Bay Lowlands area.

E) Information submitted pertaining to Oil Shale Exploration under Oil Shale Reservations and Special Projects.

F) Information and data pertaining to Helium Exploration submitted under Helium Reservations, Special Reservations and Geophysical Licenses.

G) Reports on Velocity Surveys.

On request, and whenever possible, this data will be made available for the cost of reproduction:

1. Maps: $5.00/copy
2. Reports: $0.25/xerox page

A) GEOLOGICAL SURVEYS (Structure Test Holes, Core Holes, Wells)

Geological and Geophysical Licenses:

Lic. No. 1 — California Standard - 1947

Southwestern Manitoba — Twps. 1-12, Rges. 14-29 WPM; Twps. 13-18, Rges. 22-29 WPM

1. Final Geological Report
2. Structure Test Holes - Wawanesa Area Twps. 7,8; Rge. 17
   - Souris River Area Twps. 1-13, Rges. 10-18
   - A. Report
   - B. E logs and S.T.H. Location Maps

Lic. No. 10 — Imperial Oil - 1950

Riding Mountain and Duck Mountain Areas — Twps. 17-21, Rges. 19-29 WPM; Twps. 21-30, Rges. 26-29 WPM

Final Technical report and a Drilling Report for 4 wells:

Imperial Birtle 1-27-17-26
Imperial Madeline Prov. 16-18-18-29
Imperial Foxwarren Prov. 16-32-19-27
Imperial Bluewing Lake Prov. 13A-4-24-27

Lic. No. 15 — Red-Man Oils - 1950

Russell, Rossburn — Twps. 19-22, Rges. 24-29 WPM

Geological Report on Structure Test Holes

- A. S.T.H. Location Map
- B. Structure Contour Map - Top of "First Specks"
- C. E Logs

Lic. No. 20 — Shell Oil - 1951

Swan River Area — Twps. 34-38, Rges. 25-29 WPM

Geological Report, plus:

1. Geological Report
   - S.T.H. #1 (NE 36-36-25)
   - S.T.H. #3 (NW 31-36-26)
2. Geological Report - 2 wells:
   Shell Swan River Prov. 13-3-35-29
   Shell Swan River 9-1-37-28
3. Structure Test Holes - Location Map (97 holes) - showing "useful substances" (sand, gravel, coal, water)
4. Film of electric logs for 97 structure test holes, and Riley copies 1" = 40'.

A

Lic. No. 22 — British American Oil - 1951

Grandview, Gilbert Plains — Twps 23 - 27, Rges 21 - 23 WPM

1. Geological Report

2. Sample Description for the following wells:

B. A. Gilbert Plains Prov. 16-18-24-21
B. A. Grandview Prov. 16-30-24-23
B. A. Grandview Prov. 16-15-25-25
B. A. Grandview Prov. 13-24-26-23

Lic. No. 26 — Canadian Devonian - 1952

Spruce Woods — Twps 8, 9, Rges 11, 12 WPM
Duck Mountain, Benito — Twps 30 - 34, Rges 27 - 30 WPM

1. Photogeological Report with structure cross-sections.

2. Geological Report
   a. Structure Test Hole Locations
   b. Surface Geology Maps
   c. E-Logs

3. Applications to drill and abandon, location plats, and daily drilling report for structure test hole locations.

Lic. No. 34 — West Plains - Sweet Grass - 1953

Neepawa — Twps 11 - 18, Rges 14 - 17 WPM

1. Geological Report on Reservation with cross-section of SW Manitoba.
   1 - Maps — a. Structure Contours
      1. Top Favel
      2. Top Winnipegosis
      3. Top Precambrian
   b. Isopach
      1. Top Favel - Precambrian
      2. Ground Level - Precambrian
      3. Paleozoic - Winnipegosis
   c. Paleogeolic map of the Paleozoic surface.
   2 - Photogeological Mosaics - 12 sheets, Neepawa Area.

2. Geological Report on Structure Test Holes.
   Structure Test Hole Locations.

Lic. No. 51 — California Standard - 1955

Roblin Area — Twps 23 - 26, Rges 24 - 28 WPM

Geological and Drilling

1. One Well - Mill Creek East Bluewing Lake 1-11-24-26
   a. Logs
   b. Core and samples

Lic. No. 53 — Great Sweet Grass - 1955

Duck Mountain — Twps 27 - 35, Rges 23 - 27 WPM

1. Preliminary Geological Report
   a. Photogeological Mosaics: (9 sheets) Twps 26-36, Rges 22-28
   b. Surface Geology and Structure Contour Map of the Favel Formation.

2. Report on lease selections & maps

   A. Structure Maps:

      a. Contours on Top of Favel Formation
      b. Contours on Top of Palaeozoic
      c. Contours on Top of Winnipegosis Formation

   B. Isopach Maps:

      a. Isopach map of interval from Top of Palaeozoic to Top of Winnipegosis.
      b. Isopach map of interval from Top of Favel to Top of Palaeozoic.

   C. NW - SE Cross-section

3. Structure Test Holes

   a - Locations
   b - Geological Report
   c - E-Logs

4. Geological Report

   A. Structure

      a. Contours on Top of Favel Formation
      b. Contours on Top of Palaeozoic
      c. Contours on Top of Winnipegosis Formation

   B. Isopach Maps:

      a. Isopach map of interval from Top of Palaeozoic to Top of Winnipegosis.
      b. Isopach map of interval from Top of Favel to Top of Palaeozoic.

Lic. No. 54 — Canadian Oil & Gas - 1955

Swan River Area — Twp. 34, Rge. 27 WPM

1. Geological Report

2. Preliminary Report - Oil and Gas Prospects
   Structure Contour Map - Top of Favel, Twps 33 - 36, Rges 25 - 29.

Lic. No. 63 — Canadian Devonian - 1956

Morden Area — Twp. 1, Rges 5 - 7 WPM

Exploration and Geological Report

1. Map: Structure Contour, Second Specks (Favel)
2. Structure Test Hole Locations
3. E-Logs.

Lic. No. 73 — Sun Oil Co. - 1957

S. E. Manitoba — Twps 5 - 10, Rges 5E - 3 WPM

Geological Report on Southern Manitoba.

1. Core Hole Locations - 10 holes.
2. Final progress report

   Maps:

   a. Structure Contour - Top of Precambrian
   b. Isopach: Upper Winnipeg Sand
      Twps 1 - 14, Rges 7E - 11W, Twps 1 - 11, Rges 11 - 15W.

A

Lic. No. 75 — California Standard - 1958

Woodlands Area — Twps 14 - 17, Rges 1 - 2 WPM; Twps 17 - 19, Rges 2 - 3 WPM

1. Preliminary Geological Report.
2. Logs, samples and core from the following well:
   Calstan Woodlands Prov. 4-6-15-2 WPM
3. Final Geological Completion Report.

Lic. No. 76 — Shell Oil - 1958

Gregg Area — Twps 10 - 14, Rges 13 - 17 WPM; Twps 11 - 19, Rges 18 - 20 WPM; Twps 15 - 19, Rges 21 - 22 WPM

1. Preliminary geological report.
2. Summary Report.
3. Final geological report.
   A. Maps:
      a. Core hole locations
      b. Structure contours on - 1. Top Favel Formation
         2. Top Spearfish Formation
         3. Top Paleozoic Formation
         4. Top Souris River Formation
      c. Isopach contours of - 1. Paleozoic
         2. Duperow
   B. Cross-section.
4. 14 Core Holes - Devonian Tests
   a. Logs
   b. Samples

Lic No. 77 — Sun Oil Co. - 1958

S. E. Manitoba — Twps 9 - 12, Rges 2E - 2 WPM

Geological Drilling
Maps: a. Structure Contour - Top of Precambrian
b. Isopach Upper Winnipeg Sand.

Interpretation is added to maps under Lic. 73.

Lic. No. 86 — California Standard - 1961

Birdtail Area — Twps 15 - 18, Rges 27 - 28 WPM; Twps 17 - 18, Rge. 29 WPM

1. Exploration Report
2. Geological Report

Reston Area — Twp. 5, Rges 27 - 28 WPM; Twp. 7, Rges 27 - 28 WPM

1. General Geological Report
2. Final completion and Geological Report for 7-35-6-28

Russell Area — Twps 20 - 21, Rge. 29 WPM

1. General Geological Report
2. Logs, samples and core for: Calstan Endcliffe 9-9-21-27
3. Final completion and Geological Report for the well.

A

Lic. No. 102 — Atlantic Refining - 1965

Treherne Area — Twps 5 - 8, Rges 6 - 12 WPM

(Oil Shale Reservation 11, 12, 13)

Lic. No. 107 — Phoenix Canada Oil - 1965

Carman Area — Twps 5 - 7, Rges 3 - 6 WPM

1. Preliminary geological report

2. Maps and cross-sections
   a. Correlation cross-section generalized
   b. Structure contours, Palaeozoic unconformity
   c. Structure cross-sections A-A, B-B, C-C.

Lic. No. 115 — Greater Winnipeg Gas Co. - 1968

Carman Area — Twps 7 - 12, Rges 1 - 4 WPM

Structure Test hole program

A. Geological report including:
   1. A map showing the location of the correlation holes drilled together with the structure of the Gunton Formation.
   2. A cross-section showing the structural markers used in mapping.
   3. A short report of work done.

B. Tour reports.

C. Location plats.

D. Progress Reports.

E. 25 electric logs for the structure test holes.

Lic. No. 118 — Sinclair Canada Oil - 1968

Riding Mountain Area — Twps 18 - 19, Rges 17 - 18 WPM
Twps 19 - 22, Rges 15 - 16 WPM

1. Preliminary geological report.
   Preliminary maps and cross-sections
   a. Structure contour maps, top Winnipeg Sandstone.
   b. Isopach map, net thickness, upper end sand member Winnipeg Formation
   c. Index map, extent upper sandstone member, Winnipeg Formation
   d. Stratigraphic cross-section, A-A Winnipeg.
   e. Stratigraphic cross-section, B-B, Winnipeg.

2. Final geological report.
   Final Maps
   a. Structure on Precambrian
   b. Isopach of upper sand member, Winnipeg fm.
   c. Stratigraphic cross-section - A-A, Winnipeg Formation
   d. Stratigraphic cross-section - B-B, Winnipeg Formation

Lic. No. 122 — Greater Winnipeg Gas Co. 1969

Carman Area — Twps 3 - 11, Rges 1 - 4 WPM

Structure Test Hole Program

Maps and interpretation is added to Lic. No. 115

Lic. No. 129 — Husky Oil Limited - 1970

Dawson Bay Area — Twps. 44 - 46, Rges. 24 - 28 WPM

Geological report and summary of Exploration.

A

Geological and Geophysical Reservations:

Res. No. 57 — British American Oil - 1956

Lavenham Area — Twps 9, 14, Rges 7 - 13 WPM

1. Preliminary Geological Report
2. Geological completion report for one well.

Res. No. 58 — Amerada Petro Corp. - 1956

Spruce Woods Area — Twps 8 - 10, Rges 14 - 16 WPM

1. Geological Report
2. Geological completion report for one well.

Res. No. 59 — British American Oil - 1957

Neepawa Area — Twps 15 - 18, Rges 12 - 13 WPM
Twps 16 - 18, Rge. 14 WPM
Twps 17 - 18, Rge. 15 WPM

1. Preliminary Geological Report
2. Geological completion report for one well.

Res. No. 72 — British American Oil - 1961

S. W. Manitoba — Twps 1 & 2, Rge. 23 WPM
Twps 2 - 4, Rge. 24 WPM

1. General geological report.

Res. No. 105 — Shell Oil - 1968

Dauphin Lake Area — Twps 22 - 26, Rges 15 - 18 WPM

1. Preliminary geological report
2. Final technical report
   a. Structure contour - isopach map, Winnipegosis Formation Twp. 11 - 31, Rge. 4 - 28 W.
   b. Structure contour - top Winnipeg Formation with Isopach upper sand member and stratigraphic cross-section (1" = 3 mi.), Twps 12-29, Rges 11-25 W.

Res. No. 115 — Asamera Oil Corporation - 1971

Plum Area — Twps 1 - 3, Rges 1E - 3 WPM
Twp. 4, Rges 1E - 1 WPM

Geological and geophysical investigation report.

Res. No. 116 — Asamera Oil Corporation - 1971

Sifton Area — Twps 24 - 28, Rge. 20 WPM
Twp. 28, Rge. 21 WPM

Geological and geophysical investigation report.

B) SEISMIC SURVEYS

Geological and Geophysical Licenses:

Lic. No. 1 California Standard - 1947

S. W. Manitoba Twps 1 - 18, Rges 14 - 29 WPM

Seismic Report

Maps:

Pelican Lake Area Twps 1 - 6, Rges 14 - 21

1. Shot point locations, elevations & lithologs

2. Seismic structure contour maps
   a. Favel
   b. Mississippian
   c. Devonian
   d. Winnipeg Shale

3. Seismic Isochron maps:
   a. Favel - Mississippian
   b. Favel - Top of Devonian
   c. Favel - Winnipeg Shale
   d. Mississippian - Devonian
   e. Devonian - Winnipeg Shale

4. Shot hole lithology plotted on map.

Turtle Mountain Area Twps 1 - 6, Rges 22 - 29

1. Shot point location, elevations & lithologs

2. Seismic structure contour maps.
   a. Favel
   b. Mississippian
   c. Devonian
   d. Winnipeg Shale

3. Seismic Isochron maps:
   a. Favel - Mississippian
   b. Favel - Top of Devonian
   c. Mississippian - Devonian
   d. Devonian - Winnipeg Shale

4. Shot hole lithology plotted on map.

Brandon Area Twps 7 - 10, Rges 20 - 21

1. Shot point location, elevations, & lithologs

2. Seismic structure contour maps:
   a. Devonian

3. Shot hole lithology plotted on map.

Virden Area Twps 7 - 12, Rges 22 - 29

1. Shot point locations, elevations & lithologs

2. Seismic structure contour maps
   a. Favel
   b. Mississippian
   c. Bakken
   d. Winnipeg Shale

3. Seismic Isochron maps:
   a. Favel - Bakken
   b. Favel - Winnipeg Shale
   c. Mississippian - Bakken
   d. Bakken- Winnipeg Shale

4. Shot hole lithology plotted on map.

Shoal Lake Area Twps 13 - 18, Rges 22 - 29

1. Shot point locations, elevations & lithologs

Shoal Lake Area (Cont'd)

2. Seismic Structure Contour maps:
   a. Favel
   b. Palaeozoic & Jurassic
   c. Middle Devonian
   d. Winnipeg Shale

3. Seismic Isochron maps:
   a. Favel - Palaeozoic & Jurassic
   b. Favel - Winnipeg Shale
   c. Middle Devonian - Winnipeg Shale

4. Shot hole lithology plotted on map.

Lic. No. 10 — Imperial Oil - 1950

Riding Mountain — Twps 17 - 20, Rges 18 - 25 WPM
Duck Mountain Areas — Twps 17 - 30, Rges 26 - 29 WPM

1. Final Technical Report including Maps:
   a. Shot point locations & elevations
   b. Contours on approx. Top of Palaeozoic

2. Shot hole Lithologic logs.

Lic. No. 12 — Souris Valley - 1950

Lyleton Area — Twps 1 - 2, Rges 26 - 29 WPM

A. Siesmic Report, including structure contour maps on:
   1. Cretaceous
   2. Lower Cretaceous
   3. Triassic ?
   4. Upper Devonian
   5. Basal Devonian

B. Seismic interpretation cross-sections.

Lic. No. 14 — Shell Oil - 1950

Swan River Area — Twps 34 - 38, Rges 25 - 29 WPM

1. Map of shot hole locations & elevations one month only due to lack of energy in area.

Lic. No. 41 — Imperial Oil - 1953

South West Manitoba — Twps 1 - 11, Rges. 19 - 29 WPM

1. Seismic shot point location & elevation map.
2. Shot hole lithologs
3. Structure contour maps on:
   A. Pierson Area, Twps1 - 6, Rges. 27 - 29
      a. Second White Specks
      b. Devonian
      c. Winnipeg
   B. Lauder Area, Twps 1 - 6, Rges. 20 - 27
      a. Second White Specks
      b. Devonian
      c. Winnipeg

B

Lic. No. 41 (Cont'd)

C. Daly Area, Twps 6 - 11, Rges. 27 - 29
   a. Second White Specks
   b. Devonian
   c. Winnipeg

D. Virden Area, Twps 6 - 11, Rges. 20 - 27
   a. Second White Specks
   b. Watrous
   c. Devonian

Lic. No. 44 — Socony Oil - 1954

Virden Area — Twps 9 - 10, Rges 24 - 25 WPM

1. Report on experimental seismic work.
2. Maps:
   a. Structure contour on top of:
      1. Blairmore
      2. Nisku
   b. Shot point locations, elevations & surficial deposits

Lic. No. 45 — Texaco Exploration Co. - 1954

S.W. Manitoba — Twps 1 - 5, Rges 23 - 29 WPM

Pierson Project: Twps 3 - 4, Rges 26 - 29
a. Final geological report.
b. Structure contour maps:
   1. Surface topography
   2. Cretaceous
   3. Jurassic
   4. Mississippian
   5. Devonian
c. Time contour maps:
   1. Cretaceous - Mississippian
   2. Cretaceous - Devonian
   3. Mississippian - Devonian
d. Shot point locations & elevations
e. Shot hole lithologs

Coulter Project: Twp. 1, Rges 26 - 27
a. Final geological report
b. Structure contour maps:
   1. Surface topography
   2. Cretaceous
   3. Jurassic
   4. Mississippian
   5. Devonian
c. Time contour maps:
   1. Cretaceous - Mississippian
   2. Cretaceous - Devonian
   3. Mississippian - Devonian
d. Shot point locations & elevations
e. Shot hole lithologs.

Deloraine Project: Twps 1 - 5, Rges 23 - 27
a. Final geological report
b. Structure contours:
   1. Surface topography
   2. Cretaceous
   3. Jurassic
   4. Mississippian
   5. Devonian
c. Time contour maps:
   1. Cretaceous - Devonian
   2. Mississippian - Devonian
d. Shot point locations & elevations
e. Shot hole lithologs.

B

Lic. No. 51 — California Standard - 1955

Russell Area — Twps 19 - 24, Rges 25 - 29 WPM
Shevlin Area — Twp. 25, Rges 25 - 29 WPM

1. Report on exploration, geological and geophysical

Structure Contour Maps:

1. Favel
2. Palaeozoic & Jurassic
3. Middle Devonian
4. Winnipeg Shale

Isochron Maps:

1. Favel - Top Palaeozoic & Jurassic
2. Favel - Winnipeg Shale
3. Middle Devonian - Winnipeg Shale

2. Map of Shot hole location & elevations.
3. Map showing surficial deposits.
4. Shot hole lithologic logs.

Lic. No. 56 — Amerada Petr. Corp. - 1955

Lauder - Oak Lake Area — Twp. 1, Rge. 20 WPM; Twps 5 - 8, Rges 24 - 26 WPM

1. Shot point location plats.
2. Map: proposed grid for seismic survey.

Lic. No. 57 — Canadian Gulf - 1956

Butler Area — Twps 9 - 10, Rges 28 - 29 WPM

1. Shot hole location map & elevations
2. Lithologic logs
3. Seismic Contour Map on Intermediate Horizon - Lodgepole

Lic. No. 61 — Tidewater - 1956

Butler Area — Twps 9 - 10, Rge. 29 WPM

1. Report on seismic surveys

Maps:

a. Structure contour:
   1. Top of second Specks
   2. Top of Mississippian
b. Shot point locations & elevations

2. Lithologic logs.

Lic. No. 62 — Texaco Exploration Co. - 1956

Melita Area — Twps 1 - 5, Rges 23 - 25 WPM

Waskada project - Twps 1, 2, Rges 23 - 25
Lauder project - Twps 3 - 5, Rges 23 - 25

For each project:
1. Technical report.
2. Map of shot hole location and elevation.
3. Shot hole litholog.

Interpretation is added to maps of License No. 45.

Lic. No. 64 — Imperial Oil - 1956

Hamiota Area — Twps 13 - 15, Rges 24 - 26 WPM

A. Final technical report

Maps:

1. Structure contour top Devonian or near Top Palaeozoic
2. Shot point locations & numbers
3. Shot point elevations

B

Lic. No. 67 — British American Oil - 1956

North Virden Area — Twps 10 - 12, Rges 26 - 27 WPM

1. Shot hole locations & elevations
2. Maps: Structure contours on intermediate horizons (Lodgepole)
3. Shot hole lithologic logs
4. Report of operations

Lic. No. 70 — California Standard - 1957

Russell Area — Twp. 21, Rges 27 - 28 WPM
Hartney Area — Twp. 5, Rge. 24 WPM

1. Shot hole locations and surficial deposits - both areas
2. Lithologic logs
3. Summary report - Russell Area

Interpretation in added to maps of License No. 51.

Lic. No. 71 — Shell Oil - 1957

Hartney Area — Twps 5 - 6, Rge s20 - 21 WPM

1. Summary report of the regional geology.

Maps: a. Structure contour - Jurassic (J) (Twps 5 - 6, Rge. 24)
b. Structure contour - Devonain Nisku (Twps 5 - 6, Rges 20 - 21)

Lic. No. 76 — Shell Oil - 1958

Gregg Area — Twps 17 - 19, Rges 19 - 21 WPM
Findlay Area — Twps 5 - 9, Rges 21 - 26 WPM

A. Summarized geological reports, Gregg Area and Findlay Area

1. Seismic contour maps, Jurassic JP5, Gregg Area
2. Seismic contour map, Devonian near top of Nisku, Findlay Area
3. Shot hole locations & elevations.

B. Shot hole lithologic logs.

Lic. No. 79 — British American Oil - 1959

Melita Area — Twps 2 - 5, Rges 26 - 29 WPM

A. Seismic Report

Maps:
1. Structure Contour: a. Second White Specks
b. Mississippian
c. Devonian
2. Isochron map: Prairie evaporite - Winnipeg.

Lic. No. 81 — Shell Oil - 1960

West Hartney Area — Twps 5, 6, Rges 23 - 25 WPM

1. Seismic summary report
2. Map showing shot hole locations, surface elevations, and surficial deposits.
3. Maps:
   a. Structure contours:
      1. Second White Specks
      2. Winnipeg
   b. Isopach maps:
      1. Second White Specks - Winnipeg

B

Lic. No. 82 — Texaco Exploration Co. - 1960

Hartney Area — Twps 5 - 6, Rges 23 - 25 WPM

Technical Report

1. Structure contour maps:
   a. Second White Specks
   b. Palaeozoic Unconformity
   c. Devonian
2. Shot point elevations, topography
3. Drift map - (drill hole lithology)

Lic. No. 87 — Texaco Exploration - 1961

S. W. Manitoba

Turtle Mountain Project: Twps 2 - 3, Rge. 22 and Twp. 3, Rge. 23 WPM

Technical Report

A. Maps:
   1. Structure contours
      a. Topography
      b. Second White Specks
      c. Mississippian
      d. Devonian
      e. Ordovician
   2. Isopach maps:
      a. Second White Specks - Mississippain
      b. Mississippian - Devonian
      c. Devonian - Ordovician
   3. Topographic maps - shot hole locations & elevations.

B. Drillers logs

Tilston Project: Twps 4 - 6, Rges 28 - 29

Technical Report

A. Maps:
   1. Structure contours:
      a. Topography
      b. Second White Specks
      c. Regional Second White Specks
      d. Mississippian
      e. Devonian
      f. Precambrian
   2. Isopach maps:
      a. Second White Specks
      b. Mississippian - Devonian
      c. Devonian - Precambrian
   3. Topographic map - shot hole locations & elevations

B. Drillers logs.

Peacock Project: Twp. 5, Rges 26 - 27

Technical Report

A. Maps:
   1. Structure contours:
      a. Topography
      b. Second White Specks
      c. Mississippian
      d. Devonian
      e. Precambrian
   2. Isopach maps:
      a. Second White Specks - Mississippian
      b. Mississippian - Devonian
      c. Devonian - Precambrian
      d. Project report
   3. Topographic maps - shot hole location & elevation

B. Drillers logs.

B

Lic. No. 89 — Shell Oil - 1961

Tilston Area — Twps 5 - 6, Rge. 29 WPM

1. Seismic - summary report
2. Map showing shot hole locations, elevation & surficial materials.

No available interpretive maps because of seismic data poor quality.

Lic. No. 91 — British American Oil - 1961

Melita - Tilston Area — Twp. 4, Rges 26 - 27 WPM; Twp. 5, Rges 26 - 28 WPM; Twp. 6, Rges 26 - 29 WPM

1. Summary report

Maps:

a. Structure contours;
   1. Mississippian
   2. Devonian
b. Isopach maps:
   1. Prairie Evaporite - Winnipeg
c. Seismic shot point location & elevation map.

2. Shot hole lithologs.

Lic. No. 95 — Mobil Oil of Canada - 1963

North Antler Area — Twps 7, 8, Rge. 29 WPM

1. Seismic Report

Maps:

A. Time Contour Maps:
   1. Top of Colorado
   2. Top of Watrous
   3. Top of Palaeozoic Unconformity
   4. Top of Bakken
   5. Top of Winnipeg

B. Time Interval Contour Map:
   1. Top of Palaeozoic Unconformity - Top of Bakken

C. Depth Contour Maps:
   1. Structure contour map on approx. Top of Palaeozoic Unconformity
   2. Isopach map Palaeozoic Unconformity - Devonian Nisku

D. Shot point locations and elevations map.

Lic. No. 100 — Noranda Exploration - 1964

Welby - Binscarth Area — Twps 17 - 19, Rge. 29 WPM

1. Summary letter

A. Structure contour maps: 1. Top of Mississippian
   2. Top of Prairie Evaporite
B. Shot hole location map with lithology.

Lic. No. 103 — Frontier Oil & Gas Ltd. - 1965

Kennay Area — Twps 10, 11, Rges 19, 20 WPM

1. Shot hole location map.
2. Film containing:
   a. Drilling reports
   b. Seismic Records
   c. Shot field data
   d. Observers report
   e. Survey notes

No report was submitted.

Lic. No. 105 — Tenneco Oils - 1966

Kirkella Area — Twps 10 - 13, Rge. 29 WPM

Report of Seismic Survey.

Maps:

A. Structure:
   1. First White Specks
   2. Top of Jurassic
   3. Mississippian
   4. Nisku

B. Isochron:
   1. First White Specks - Mississippian
   2. First White Specks - Prairie Evaporite
   3. First White Specks - Winnipegosis
   4. First White Specks - Cambrian

C. Shot point location map.

D. Surface topography.

E. Driller log.

Lic. No. 106 — Canadian Pacific - 1966

S. W. Manitoba — Twps 1 - 8, Rges 23 - 29 WPM

Seismic Report

Maps:

1. Seismic structure maps:
   a. Watrous
   b. Mississippian
   c. Birdbear
   d. Nisku
   e. Dawson Bay
   f. Precambrian

2. Shot point location maps, elevation & lithology.

Lic. No. 110 — Canadian Pacific - 1967

Melita Area — Twps 1 - 9, Rges 23 - 26 WPM

Summary report of seismic structure data

Maps:

a. Structure contour maps:
   1. Second White Specks
   2. Birdbear

b. Isopach maps:
   1. Second White Specks - Mississippian
   2. Watrous - Mississippian
   3. Mississippian - Birdbear
   4. Birdbear - Dawson Bay
   5. Dawson Bay - Precambrian

c. Surface elevations & shot hole logs.

d. Location plot outlining shot point co-ordinate system.

Lic. No. 112 — Northern Oil Explorers - 1967

Rock Lake Area — Twp. 2, Rges 14, 15 WPM

1. Isochron maps:
   a. Second White Specks to Duperow
   b. Second White Specks to Basement
   c. Duperow to Basement

2. Shot hole location map.

No report was submitted.

B

Lic. No. 116 — Dekalb Petroleum - 1968

Waskada - Napinka Area — Twp. 1, Rge. 25 WPM

1. Waskada Area
   a. Structure Contour:
      1. Second White Specks
      2. Top of Mississippian
      3. Birdbear
      4. Winnipeg
   b. Isopach
      1. Jurassic - Mississippian
      2. Jurassic - Birdbear
      3. Mississippian - Winnipeg
      4. Birdbear - Winnipeg
   c. Shot point location & elevation map
2. Napinka Area — Twp. 4, Rges 25, 26 WPM

   One seismic line between Twps 3, 4, Rges 25, 26.
   Same Series as above.

Lic. No. 119 — Midwest Oil Corporation - 1968

Goodlands Area — Twps 2 - 3, Rge. 23 WPM
Deloraine Area — Twps 1 - 2, Rge. 24 WPM

1. Seismic Report
   A. Isopach Maps:
      a. Second White Specks - Mississippian
      b. Second White Specks - Nisku
      c. Mississippian - Nisku
   B. Shot point location map
2. Drill logs.

Lic. No. 123 — Union Oil - 1969

S. W. Manitoba

Napinka Area: Twp. 4, Rge. 25 WPM
Geological Report
   a. Contour maps: 1. Top of Mississippian
      2. Top of Devonian
      3. Approximate Winnipegosis
   b. Isochron Map: Mississippian - Devonian
   Drill logs
   Survey elevation sheets

Waskada - Coulter Area: Twps 1, 2, Rges 25 - 27 WPM
Geological Report
   a. Contour maps: 1. Top of Mississippian
      2. Top of Bakken - 3 Forks
      3. Middle Devonian
   b. Isochron Map: 1. Mississippian - Bakken
      2. Middle Devonian - Ordovician
   Drill logs
   Survey elevaton sheets.

Melita Area: Twp. 5, Rge. 23 and Twp. 4, Rges 25, 26
Geological Report
   a. Contour map: 1. Top of Mississippian
      2. Approximate Nisku
      3. Approximate Winnipegosis
   b. Isochron: 1. Top of Mississippian
      2. Approximate Nisku
   Drill logs
   Survey elevation sheets.

B

Lic. No. 124 — Midwest Oil Corporation - 1969

Napinka Area — Twp. 4, Rges 24, 25 WPM

1. Seismic Report

Maps:

A. Structure maps:
   a. Second Specks Structure
   b. Jurassic Structure
   c. Nisku Structure
   d. Winnipeg Structure

B. Isopach maps:
   a. Second Specks to Jurassic Isochron
   b. Second Specks to Nisku Isochron
   c. Jurassic to Nisku Isochron
   d. Nisku to Winnipeg Isochron

C. Shot point location map

D. Surface elevation

2. Drill logs.

Hernfield Area — Twp. 1, Rge. 25 WPM

1. Seismic Report

Maps:

A. Structure maps:
   a. Blairmore Structure
   b. Mississippian Structure
   c. Nisku Structure
   d. Winnipeg Structure

B. Isopach
   a. Blairmore to Nisku Isochron
   b. Blairmore to Mississippian Isochron
   c. Mississippian to Nisku Isochron
   d. Nisku to Winnipeg Isochron

C. Shot point location map.

D. Surface elevation

2. Drill logs.

B

Geological and Geophysical Reservations:

Res. No. 91 — Golden Eagle Oil & Gas & Chagos - 1966

Lulu Lake Area — Twp. 1, Rge. 21 WPM

1. Seismic report (review of 1947 survey by California Standard Lic. No. 1)

   A. Maps:

      Seismic structure contour maps:
      a. Second White Specks
      b. Top of Mississippian
      c. Top of Devonian
      d. Top of Precambrian
      e. Surface elevations

      Seismic Isochron maps:
      a. Second White Specks - Top of Mississippian
      b. Top of Mississippian - Top of Devonian
      c. Top of Devonian - Precambrian

   B. (a - b) Seismic Structure cross-sections (eight)

C) Other Geophysical Data

Geological and Geophysical Licenses:

Lic. No. 1 — California Standard - 1947

S. W. Manitoba — Twps 1 - 12, Rge s12 - 29 WPM

Maps:

1. Portage la Prairie Area — Twps 8 - 9, Rges 12 - 13 WPM
   a. Observed Gravity
   b. Gravity Station Elevation Map
   c. Observed Magnetic Contours
2. Brandon Area
   a. Regional Gravity Map — Twps 7 - 12, Rges 13 - 21
   b. Gravity Station Elevation Map
   c. Observed Gravity — Twps 7 - 11, Rges 14 - 17
   d. Observed Magnetic Contours — Twps 8 - 10, Rges 14 - 17
3. Virden Area
   a. Raw Gravity — Twps 7 - 12, Rge. 22
   b. Gravity Station Elevation Map — Twps 7, Rge. 23; Twps 9 - 12, Rges 23 - 25; Twps 11 - 12, Rges 26 - 27
4. Turtle Mountain Area
   a. Observed Gravity — Twps 1 - 3, Rges 21 - 24
   b. Observed Magnetic — Twps 1 - 2, Rges 21 - 24
   c. Gravity Station Location & Elevation — Twps 1 - 6, Rges 22 - 26
5. Souris River Area
   a. Raw Gravity — Twps 3 - 8, Rges 22 - 29
6. Pelican Lake Area
   a. Raw Gravity — Twp s1 - 6, Rges 14 - 21
   b. Gravity Station Location & Elevation

Lic. No. 12 — Souris Valley Oil - 1950

Lyleton Area — Twps 1 - 5, Rges 24 - 29 WPM

Gravity Meter Survey
Gravity Meter Report Only
All Maps missing.

Lic. No. 13 — Hart Green - 1950

W & S of Morris — Twps 3 - 5, Rges 1 - 4 WPM

Gravity Meter Survey
Gravity Map and Report

Lic. No. 22 — British American Oil -1951

Grandview; Gilbert Plains Area — Twps 24 - 27, Rges 21 - 25 WPM

Gravity Meter & Magnetometer Surveys
1. Magnetometer Report and maps
2. Gravity Meter Report and maps:
   a. True Gravity Map showing interpretation
   b. Residual Anomaly map
   c. Location map showing gravity and magnetometer stations

C

Lic. No. 23 — British American Oil- 1951

Virden Area — W½ Twps 9 - 10, Rge. 26 WPM; Twps 9 - 11, Rges 27 - 28 WPM

Gravity Meter & Magnetometer Surveys — Twp. 10, Rge. 29 WPM

A. Gravity Meter Report
   1. Gravity Map
   2. Residual Anomaly Map

B. Magnetometer Report
   1. Magnetometer Map

Lic. No. 28 — H. B. Parker - 1952

Duck Mountain Area — Twp. 30, Rge. 29 WPM

1. Aero-radiation report and profiles

Lic. No. 29 — Heath Gold Mines - 1952

Swan River Area — Twp. 37, Rge. 29 WPM

1. Aeromagnetic report and maps

Lic. No. 32 — Great Sweet Grass - 1952

Brandon Area — Twp. 4, Rges 10 - 11 WPM; Twp. 5, Rge. 8 WPM; Twps 5 - 6, Rge. 9 WPM

Geomagnetic Survey

Geomagnetic Contour Map and Report

Lic. No. 33 — Colin Campbell - 1953

Bowsman Area — Twp. 38, Rge. 28 WPM

Gravity Meter Report

Regional and Residual maps missing.
Gravimeter Station Elevations Map available.

Lic. No. 34 — West Plains - 1953

Neepawa Area — Twps 13 - 14, Rges 14 - 17 WPM; Twps 14 - 15, Rges 13 - 15 WPM

Geomagnetic Survey

Geomagnetic Report
   a. Geomagnetic Contour Map
   b. Magnetic Survey - Hope Claims (Iron Formation)

Lic. No. 35 — Britco Oils - 1952

Swan River Area — Twp. 35, Rges 25 - 26 WPM

Gravity Meter Report

a. Residual Gravity Map
b. Regional Gravity Map
c. Gravimeter Station Elevations

C

Lic. No. 37 — Uscana Oils - 1953

Pilot Mound Area — Twp. 1, Rges 9 - 10 WPM; Twps 2 - 3, Rges 9 - 11 WPM

Gravity Meter Survey

1. Gravity Meter Report

Maps:
a. Residual Gravity
b. Regional Gravity
c. Station Locations and Elevations

Lic. No. 43 — Imperial Oil - 1954

Brandon Area — Twps 1 - 15, Rges. 14 - 29 WPM

Aeromagnetic Survey

1. Flight lines shown on a topographic map.
2. Aeromagnetic Map.

Lic. No. 53 — Great Sweet Grass - 1955

Duck Mountain — Twps 27 - 35, Rges 23 - 27 WPM

Airborne Radiation Survey

Reports on Airborne Radiation Survey

Maps showing radiation profiles and interpretation.

Lic. No. 54 — Canadian Oil and Gas Reserves Ltd. - 1955

Swan River Area — Twps. 33 - 35, Rges. 26 - 28 WPM

Radiation Survey

1. Report on Gamma Ray Survey with Radiation Profiles
2. Geological Report
3. report on oil and gas prospects with a map showing survey lines and an assumed gas pocket.

Lic. No. 70 — California Standard - 1957

Aeromagnetic Survey — Twps 3 - 12, Rges 17 - 26 WPM

No report

Aeromagnetic Maps:

1. Twps 8 - 12, Rges 22 - 26
2. Twps 8 - 12, Rges 17 - 21
3. Twps 3 - 7, Rge s22 - 26
4. Twps 3 - 7, Rges 17 - 21

Lic. No. 85 — Sun Oil - 1960

Souris Hartney Area — Twps 5, 6, Rges 23 - 25 WPM

Gravity Meter Survey

1. Gravity - Observed isogal map - 0.2 milligal (1" = 4,000' (and progress maps with stations)

C

Lic. No. 106 — Canadian Pacific - 1966

S. W. Manitoba

No report.

Aeromagnetic maps on:

1. Waskada Tilston Area — Twps 1 - 2, Rges 17 - 29 WPM; Twps 3 - 12, Rges 27 - 29 WPM
2. Hamiota Area — Twps 12, Rges 26 - 29 WPM; Twps 13 - 17, Rges 19 - 29 WPM

Computer derivative maps, by University of Manitoba

Lic. No. 107 — Phoenix Canada Oil Co. - 1966

Carman Area — Twp. 6, Rges 2 - 6 WPM; Twp. 7, 8, Rges 2 - 5 WPM

1. Gravity Report and Bouger Anomaly Map.

Lic. No. 111 — Shell Canada Limited - 1967

Russell Area — Twps 19 - 23, Rges 26 - 29 WPM

Gravimetric Survey

Geophysical Report

Maps:

1. Residual Gravity 1.9
2. Gravity residual Bouguer values corrected with 1.9
3. Bouguer
4. Sixth degree residual 1.9
5. Sixth degree regional 1.9
6. Bouguer Gravity
7. Sixth degree regional
8. Sixth degree residual
9. Regional derived from Bouguer Gravity
10. Trend Analysis - Third Degree Residual Map
11. Surface Elevation Map

Lic. No. 115 — Greater Winnipeg Gas Co. - 1968

Carman Area — Twps 7 - 12, Rges 1 - 7 WPM

Vertical Magnetic Survey Map

Lic. No. 116 — Dekalb Petroleum Corporation - 1968

Gravity Meter Survey

Waskada — Twps 1 - 3, Rges 23 - 27 WPM
Napinka — Twp. 4, Rges 23 - 26 WPM

All Maps: scale 2" = 1 mile , same series of maps for both areas.

1. Maps:
   a. Residual gravity map
   b. Residual gravity - 5,000' circle
   c. Bouguer gravity
   d. Ground elevation
2. Gravity meter data sheets, all stations (213 sheets)

C

Lic. No. 118 — Sinclair Canada Oil - 1968

McCreary Area — Twp s19 - 25, Rges 14 - 16 WPM

Gravity Meter Survey

A. Report - Final interpretation, gravity and magnetic data.
Maps:
1. Bouguer Gravity Maps
2. (a) 9th Polynomial residual gravity map
3. (b) 9th Polynomial residual gravity map - with interpretation of gravity & Magnetics.
4. Surface elevation amp.
5. Magnetic map.

B. Trend analysis of gravity readings, computer sheets

C. Raw gravity data tables.

Lic. No. 129 — Husky - 1969

Dawson Bay Area — Twps 44 - 46, Rges 24 - 28 WPM

Electro magnetic survey, Inert Gas

1. Input EM survey report
2. Input anomaly maps, photomosaic base, 1" = mi.
a - c Five separate map sheets
3. Input tapes and 35 mm. photography for flight lines.

Lic. No. 135 — S. P. Jordan - 1975

Virden Area — Twps 9 - 13, Rges 25 - 27 WPM
Waskada Area — Twps 1, 2, Rge. 25 WPM

Electro Magnetic Survey

1. Geologic Report
a. Prospective Hydrocarbon Area Map
b. Three Geological Cross-Sections
2. Resisitivity Survey for Waskada Area
3. Resisitivity Survey for Virden Area

C

Geological and Geophysical Reservations:

Res. No. 83 - 86 — Kewanee - Ashland - 1965

Roblin - Durban Area — Twps 25, 26, Rge. 28 WPM; Twps 33, 34, Rge. 29 WPM

Gravity Meter Survey

1. Summary Geological Report
2. Report, maps and data tables: Gravity survey of Benito Area (surface elevation, Bouguer gravity, residual gravity profiles)

Res. No. 87 - 90 — Union Oil - 1965

Duck Mountain Area — Twps 29 - 32, Rge. 29 WPM

Gravity Meter Survey

1. Gravity survey report (field procedure; data table and maps - surface elevation, Bouguer gravity, residual gravity (2" = 1 Mi.), residual gravity profiles.)
2. Interpretation of gravity results.

Res. No. 107 - 111 — Central Del Rio Oils - 1968

Porcupine Hills Area — Twps 36 - 40, Rges 28 - 32 WPM

Airborne Magnetometer Survey

1. Report on airborne magnetometer survey - methods and data processing
2. Geomagnetic survey maps:
   a. Vertical gradient
   b. Total magnetic intensity map

C

AIRBORNE RADIATION SURVEY — Souris Valley - 1954

S. W. Manitoba

Virden Area: NE Section - Twps 9 - 11, Rges 24 - 26 WPM

Waskada Area: SE Section - Twps 1 - 3, Rges 23 - 27 WPM

Pierson Area: SW Section - Twps 1 - 3, Rges 27 - 30 WPM

Tilston Area: NW Section - Twps 7 - 11, Rges 27 - 29 WPM

1. Final Report

Maps:

A. Interpretation of the results of airborne radiation survey.

B. Results of survey showing radium count only.

C. Outline of different soils.

D. Interpretation of radiation survey - by detailed contouring.

E. Interpretation of radiation survey showing radium pattern over the Daly Field - 1 map - Twps 8 - 11, Rges 24 - 29.

F. Results of survey showing recordings of the total radiation plotted along the flight lines - 1 map - NE Section.

COMPOSITE MAGNETIC ANOMALY MAP

SOUTHWESTERN MANITOBA — Twps 1 - 28, Rges 12 - 29 WPM

Scale 1" = 4 miles

This is a composite of six separate magnetic maps submitted to the Mines Branch in respect to exploratory work done under Geological and Geophysical Licenses and/or Reservations. No attempt has been made to reconcile the data for the individual map areas. The area of each individual survey is noted along with reference. The contours and contour values are as shown on the originals, although some contour lines have been omitted where necessary. Note that some surveys are ground magnetometer, others are airborne.

COMPOSITE GRAVITY ANOMALY MAP

SOUTHWESTERN MANITOBA — Twps 1 - 25, Rges 4 - 29 WPM

Scale 1" = 4 miles

Based on data from Dominion Observatories Branch (Maps 39, 47)

Bouguer Anomaly Values in Tenths of Milligals

Bouguer Control Interval = 5 Milligals

D) HUDSON BAY LOWLANDS

Exploration Permits

PERMITS 1 - 35 Aquitaine Company of Canada Ltd. - 1962

A. General geological reconnaissance of Hudson Bay, 1968 by S. Rueff and S. Artru, 1969.

B. Kaskattama #1 Well - Micro facies, stratigraphic and geochemical studies, 1968.

C. Preliminary report of interpretation of aeromagnetic profiles, south-west Hudson Bay - Hunting, 1962.

D. Report of the interpretation of an airborne magnetic survey of an area near York Factory, Manitoba - Hunting, 1963.

E. Summary letter - geologic exploration considerations of the Hudson Bay area - R. D. Johnson, 1963.

F. Geological reconnaissance, Southampton, Coats and Mansel Islands - R. D. Johnson, 1963.

G. Shore-fast ice reconnaissance, Fort Churchill to Cape Tatnam, Hudson Bay - R. D. Johnson, 1963.

H. General reconnaissance, Severn River, Ontario - R. D. Johnson, 1963.

I. Oil Shale Exploration, Southampton Island - R. D. Johnson, 1964.

J. Geological and geophysical exploration, Cape Tatnam, Manitoba - R. D. Johnson, 1964.

K. Stratigraphy and petroleum possibilities of the northern Hudson Bay Lowland, Manitoba - S. J. Nelson, 1962.

L. Paleontology of Sogepet field party collections, Hudson Bay area - S. J. Nelson, 1963.

M. Report on search for coal deposits, Churchill Manitoba area - S. J. Nelson, 1964.

N. Devonian of the northern Hudson Bay Lowland, Cape Tatnam region, Manitoba and Ontario - S. J. Nelson, 1964.

O. The oil shales of Southampton Island, Northwest Territories - S. J. Nelson, 1965.

P. Paleontology of Sogepet Aquitaine Kaskattama #1 Well - S. J. Nelson, 1967.

D

Q. Well site geological and engineering summary, Sogepet Aquitaine Kaskattama #1 - 1967 (including supplement).

R. Report on a refraction seismic survey of the Hudson Bay Lowlands, Manitoba - Hunting, 1964.

S. Terrain and geomorphic studies with maps and photomosaics.

T. Study of samples collected around Hudson Bay Lowlands and Northern Island, 1968 - S. Rueff and P. Artru. Comparisons with Kaskattama #1 Well. See also revised edition, 1970.

PERMITS 36 - 46 — Houston Oils Limited - 1967

1. Gravity Survey report, with maps:
   a. Map - Station elevations (2" = 1 mi.)
   b. Map - Bouguer gravity, C.I. = 0.5 mg.
   c. Map - Bouguer gravity, (Galiski), C.I. = 0.2 mg.
   d. Plate - gravity lines 1 - 4
   e. Plate - gravity lines 5 - 8
   f. Plate - gravity lines 9 - 12
   g. Map - Residual gravity, C.I. = 0.2 mg.
2. Geological and Engineering Report on Houston et al Comeault Prov. STH No. 1

PERMITS 47 - 57 — City Savings Trust - 1967

A - K) Photogeological reports - Fracture analysis survey.
(Eleven separate reports, one for each Permit area).

PERMITS 58 - 68 — Northwest Oils - 1968

1. Well drilling report, Whitebear Creek #1 (57° 22' N, 92° 27' W.)
2. Report on aeromagnetic interpretation. Rupert Creek area, Hudson Bay, Manitoba; with interpretation map.

PERMITS 69 - 74 — Kanata Exploration Co. - 1968

1. Aeromagnetic interpretation, York Factory area, Hudson Bay, Manitoba
2. Memorandum report on reconnaissance field work, Hudson Bay Lowlands, Manitoba (re: reported oil seepage).

E) OIL SHALE RESERVATIONS

South West Manitoba

Res. No. 1 - 8 & 10 — Sun Oil Co. 1965

Porcupine Forest & Duck Mountain Area — Twps 24 - 44, Rges 20 - 29 WPM

1. Geological Report

Maps:
   a. Map of outcrop shale with core hole locations.
   b. Map of oil shale (Favel) lands with cross-section of topography and the Favel Formation.

2. Report of Research on Saskatchewan and Manitoba Oil Shales.

   By: Richard W. Ince
   Recovery Research, 1966.

Res. No. 9 — Aquitane Co. of Canada Ltd. - 1965

Riding Mountain Area — Twps 15 - 20, Rges 15 - 17 WPM

1. Study from old notes about oil shales.
2. General geological map of Manitoba from compiled data.
3. Field notes.
4. Lithologic Examination of field samples, geochemical examination, and Fisher Analysis results.
5. Final examination & drilling program.

Maps:
   1. Reservation map with contours on base of Favel Formation.
   2. Cross-sections to base of Favel (5)
   3. Litholog description of core holes (6)
   4. Location plats of core holes (15)

Res. No. 11 - 13 — Atlantic Refining - 1965

Treherne Area — Twps 1 - 14, Rges 4 - 17 WPM

Four holes were cored to base of Favel Formation.

1. Core log, and chemical analysis for the following core hole locations:
   a. 1 - 16 - 11 - 16 W1
   b. 16 - 11 - 8 - 11 W1
   c. 2 - 9 - 6 - 8 W1
   d. 1 - 27 - 1 - 16 W1

2. Cores are available at core shed.

3. Maps and cross-sections:
   a. Oil shale reconnaissance map of the Manitoba escarpment.
   b. Structural cross-section showing outcrop of cretaceous.

E

OIL SHALE

Special Projects

Amoco - 1964

Tar sand analysis on oil shale samples from the following wells:

11-9-1-27 W1
1-27-17-26 W1

Shell Canada Ltd. - 1965

Oil source-bed analysis of Winnipeg shale from the following wells:

16-33-4-13 W1
5-13-5-22 W1
2-20-11-24 W1

F) HELIUM RESERVATIONS

Res. No. 1 & 2 — Hemisphere Helium Corporation Ltd. - 1961

Res. No. 1

East Lake Manitoba — Twps 19 - 22, Rges 5 - 7 WPM

Res. No. 2

West Lake Manitoba — Twps 9 - 23, Rges 7 - 16 WPM

1. Progress report on helium exploration operations in Manitoba. A cross-section of the Winnipeg formation showing possible helium entrapment.

   By: J. Sabo
   R. Adair Oil Management

2. Helium and hydrocarbon possibilities, Lake Manitoba Area, Manitoba.

   By: R. Edie.

   1. geological cross-section, east-west, showing the possible hydrocarbon traps in the upper Jurassic sands and the possible hydrocarbon and helium entrapment in the Winnipeg sand.

   2. map of Lake Manitoba Area showing Precambrian tests and outcrops of various stratigraphic units.

Res. A, B, C — Bralorne Petroleums - 1966

East Lake Manitoba — Twps 20 - 34, Rges 1 - 10 WPM

Macrofracture pattern analysis survey of Fisherton Area - Interlake Region, Manitoba.

By: M. Berisoff.

Maps: 1. Macrofracture pattern analysis map.
2. Major Linear trends.

Husky - 1970

Geological and Geophysical License No. 129

Dawson Bay Area — Twps 44 - 46, Rges 24 - 28 WPM

Geological and Geophysical investigation was run mainly exploring for helium gas. Correspondence, and technical data are available in G. & G. License No. 129 file.

G) LIST OF REPORTS ON VELOCITY SURVEYS

Well Name	Location (WPM)		Base (ft.)	Deepest Unit	Yr.
B.A.UNION ARBUCKLE	13 24	1 12	3448	PRECAMBRIAN	56
FOSCA FLOSSY LK.	10 21	1 23	4089	NISKU	56
IMP. CHEVRON HERNEFIELD PROV.	1 30	1 25	4285	DUPEROW	56
OMEGA WASKADA	11 30	1 25	3051	TILSTON	67
CHEVRON WASKADA	9 13	1 26	5170	DEVONIAN	52
IANDA MOORE	5 20	1 27	5856	DEVONIAN	49
CPOG LYLETON	1 16	1 28	4550	DEVONIAN	67
FOSCA HALLAM LYLETON	15 5	1 29	4095	LODGEPOLE	55
IMPERIAL COPLEY	11 18	1 29	3764	MISSION CANYON	56
JUMPING POUND HORTON	8 15	2 20	5353	PRECAMBRIAN	57
OWEN MOUNTAINSIDE PROV.	8 11	2 22	3588	DEVONIAN	52
CHEVRON IMPERIAL DALNY	8 10	2 26	3395	LODGEPOLE	57
CHEVRON IMP. S. ELVA	13 30	2 27	3485	LODGEPOLE	57
CHEVRON WHITEWATER	15 36	3 22	4088	INTERLAKE	54
CHEVRON IMP. N. GOODLANDS	16 9	3 24	2895	LODGEPOLE	56
FOSCA INNES ELVA	4 17	3 27	3290	LODGEPOLE	56
IMP. CAN. SUP. PIERSON	8 26	3 29	3485	LODGEPOLE	55
CECO CAYUGA	13 31	3 29	3625	LODGEPOLE	56
IMPERIAL REGENT	12 10	4 22	2710	LODGEPOLE	56
IMPERIAL DAND	1 13	4 23	2740	LODGEPOLE	55
CHEVRON IMP. NAPINKA	2 7	4 25	2882	LODGEPOLE	57
IMPERIAL WEST BRENDA	13 17	4 26	3452	DEVONIAN	55
B.A. MACLEAN PROV.	2 11	4 28	3338	LODGEPOLE	59
IMPERIAL CHEVRON EUNOLA	4 28	4 29	4045	NISKU	56
IMPERIAL UNDERHILL	4 8	5 22	2960	DUPEROW	55
IMPERIAL CAN. SUP. ARGUE	15 13	5 23	2900	DUPEROW	56
IMPERIAL CAN. SUP. ARGUE	5 33	5 23	2800	NISKU	56
ROYALITE LAUDER	7 27	5 24	3980	SILURIAN	52
CHEVRON HARTNEY	16 33	5 24	5136	PRECAMBRIAN	50
CHEVRON IMP. RUTH	1 17	5 26	2820	LODGEPOLE	57
SUN BROOMHILL	5 30	5 26	2802	MISSISSIPPIAN	67
B.A. TWEED BEDE	13 13	5 27	2910	LODGEPOLE	61
B.A. GERVIN BROOMHILL	1 20	5 27	2997	LODGEPOLE	61

Well Name	Location (WPM)		Base(ft.)	Deepest Unit	Yr.
U.S. SMELTING HARTNEY	1 35	6 23	2470	LODGEPOLE	55
SAPPHIRE S. PIPESTONE PROV.	12 24	6 26	2960	JURASSIC	54
CHEVRON RESTON	7 27	6 27	3287	NISKU	52
M & C SOURIS	16 20	7 21	2131	NISKU	54
CHEVRON FINDLAY	9 26	7 25	4056	SILURIAN	52
CHEVRON LINKIATER	2 21	7 28	4960	DEVONIAN	52
SOCONY MOBIL JACKSON CR. PROV.	11 30	7 29	3611	NISKU	63
CHEVRON WAWANESA	3 1	8 18	3814	PRECAMBRIAN	51
SMITH AGNEW	13 27	8 26	2750	NISKU	55
CHEVRON EWART PROV.	4 14	8 28	4818	SILURIAN	51
DOME BRANDON	3 5	9 19	3995	WINNIPEG	56
DOME BRANDON	16 27	9 19	3437	ORDOVICIAN	57
MINERALOID ROUTLEDGE	14 28	9 25	2135	LODGEPOLE	55
CHEVRON WOODNORTH PROV.	5 18	9 27	3645	DEVONIAN	52
CHEVRON WEST BUTLER	1 31	9 29	3020	LYLETON	55
B.A. LAVENHAM PROV.	5 3	10 10	2325	PRECAMBRIAN	56
PEACOCK KEMNAY	13 4	10 20	1900	NISKU	57
NEW SCOPE MAPLES	6 9	10 26	2110	MISSISSIPPIAN	55
CHEVRON S. VIRDEN PROV.	16 11	10 26	2089	LODGEPOLE	56
CHEVRON DALY PROV.	7 12	10 28	2529	MISSISSIPPIAN	51
DOME HARDING	4 27	11 22	4060	PRECAMBRIAN	56
BAYSEL E. SCALLION	2 10	11 25	2100	LODGEPOLE	55
BAYSEL CALSTAN HARGRAVE PROV.	15 16	11 27	2927	DEVONIAN	51
IMPERIAL BLOSSOM	3 17	12 24	4495	PRECAMBRIAN	54
H.W. & L. EAST SCALLION	5 1	12 26	2313	NISKU	57
CHEVRON KIRKELIA	13 4	12 29	2485	MISSISSIPPIAN	55
LANGFORD NEEPAWA	5 29	14 14	2490	PRECAMBRIAN	47
DOME MINNEDOSA	16 26	14 18	3559	PRECAMBRIAN	57
HOMESTEAD BIRDTAIL	10 8	15 27	3465	INTERLAKE	56
HOMESTEAD BIRDTAIL	9 21	15 27	3395	SILURIAN	53
DOME STRATHCLAIR	8 34	16 21	3920	PRECAMBRIAN	56
DOME NACO LAZARE PROV.	12 34	16 29	4135	RED RIVER	55
IMPERIAL BIRTLE	1 27	17 26	4254	WINNIPEG	51
IMPERIAL MADELINE PROV.	16 18	18 29	4456	PRECAMBRIAN	51
PAN AM FOXWARREN PROV.	10 4	19 26	3249	SILURIAN	66
SHELL SWAN RIVER PROV.	13 3	35 29	2497	PRECAMBRIAN	52
	far north:				
SOGEPET AQUIT KASKATTAMA	K23 57	90 04	2913	PRECAMBRIAN	67

VI. Technical Well Data

The Petroleum Branch has on file technical records on all non-confidential wells drilled within the province. Files may include original well license application form, survey plan, drilling prognosis, well summary form, historical production record, core analyses, drill stem test reports, reservoir fluid analyses, absolute open flow test results and other pressure measurements, logs, drilling and service rig tour reports, and well completion reports.

These records can be examined at either the Winnipeg or Virden district office, or reproduced and forwarded for a charge of $0.25 per sheet.

Copies of microfilm reels of this well information are also available through the Branch.

VII. Core and Sample Library

A complete library of cores and samples from non-confidential wells drilled in Manitoba is maintained at the Department's core storage facilities in Winnipeg. Arrangements for the examination of this material may be made through the Branch office in Winnipeg. Please note that microscopes are not provided. An index of core information on Manitoba wells is available in the Winnipeg office.